PERSONAL
COMPUTER
weekly NEWS
AUGUST 18 · 1984 · No 74 50p.

BBC GAMES
Arcade action on your Acorn

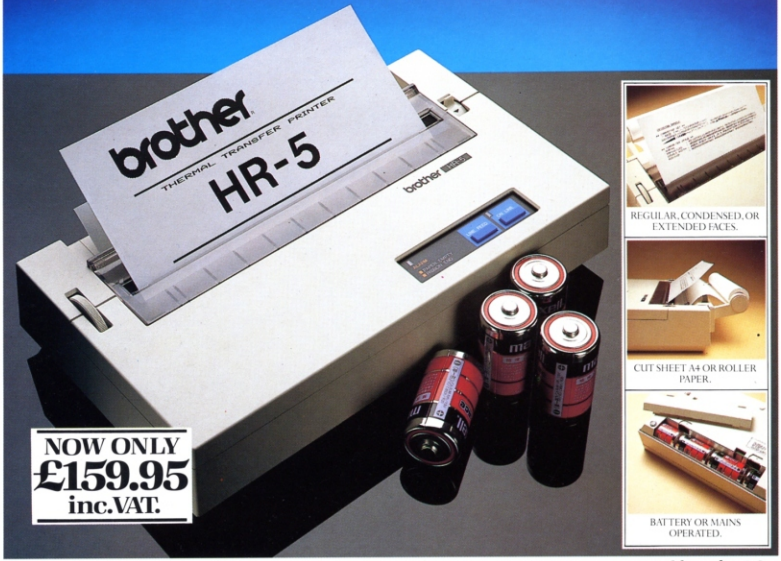
ORIC SPEECH
Get your Oric talking with this speech board

WHITE LIGHTNING:
ZAP UP YOUR SPECTRUM

COMPUTER CONTROL
Take over your world with Radionics' micro

64 PROGRAMS
Test your courage in the bullring

Little Brothers should be seen but not heard.



REGULAR, CONDENSED, OR EXTENDED FACES.

CUT SHEET A4 OR ROLLER PAPER.

BATTERY OR MAINS OPERATED.

A maxim which eloquently describes the Brother HR-5.

Less than a foot across, it's nonetheless loaded with features.

The little printer that's low on decibels.

There's one thing the HR-5 won't give you. Earache.

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Quietly efficient, it delivers high definition dot matrix text over 80 columns at 30 characters per second (maximum).

Text or graphics with ease.

The HR-5 also has something of an artistic bent.

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Incorporating either a Centronics parallel or RS-232C interface, the HR-5 is compatible with BBC, Spectrum, Oric, Dragon, Atari and most other home computers and popular software.

Perfectly portable, the battery or mains operated HR-5 weighs less than 4 lbs, and has a starting price of only £159.95 (inc. VAT).

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MENU

August 18 1984 No 74

Cover photograph by Jay Myrdal.

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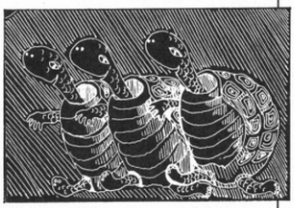
This speech box gives the popular home computers the power of speech.



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We give four Commodore crackers a run for their money.

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Into the ring with your 64, to face some life-like sprite graphics and Spanish music.

Spanish snap Dragon

Dragon users can breathe again. After a strange game of musical chairs amid the ruins of Dragon Data, the micro has been saved and future support is assured.

A Spanish company, Eurohard SA of Caceres, has bought all the assets of Dragon Data and plans to start manufacturing in Spain 'at the earliest possible moment'. This, according to a statement released last week, could be as early as September, but Spanish sources were doubtful that Eurohard could organise itself that quickly.

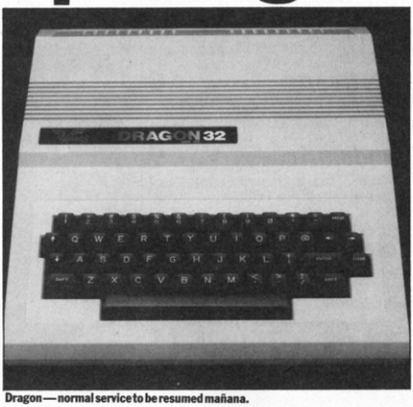
The company, in which the public sector has a majority shareholding, will be building Dragon 32s and 64s and future Dragon products. It will also control the distribution of Dragon products around the world.

Since February, Dragon's UK distributor has been GEC (issue 49) and this arrangement will continue. UK users can also look to the wealthy GEC for continued support.

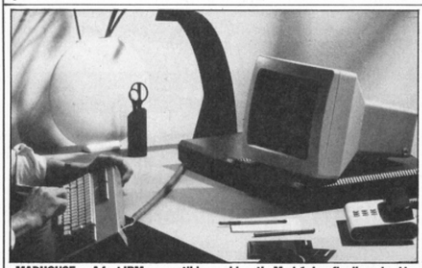
There are more familiar faces involved in the third piece of the jigsaw completed last week. Touchmaster, a new company rising from the ashes of Dragon Data, has as its managing director Brian Moore and as its commercial director Richard Wadman, both of whom held corresponding positions at Dragon.

Touchmaster's role in the new EuroDragon is central. It will help Eurohard get production rolling and will also be responsible for certain aspects — so far unspecified — of customer support and software sales in the UK.

Ultimately the main purpose of Touchmaster will be to develop and manufacture the Touchmaster pressure sensitive pad and graphics tablet. It will undertake this work at Dragon's Kenfig plant in South Wales, with the financial support of Dragon's shareholders, Prutec. Touchmaster is now a wholly-owned subsidiary of Prutec.



Dragon — normal service to be resumed mañana.



MADHOUSE — A fast IBM-compatible machine, theMad-1, has finally arrived in Britain. The Modular Advance Design (MAD-1), at £3,202 comes with MSDOS, an 80186 processor, 12 in tilt and swivel monitor, and detachable keyboard. Its memory is 128K RAM with two 360K floppies. UK distributor MBS claims that on the Mad-1 micro software packages like dBase II, Lotus 1-2-3 and SuperCalc 3 run two and a half times faster than on the IBM PC and XT. MBS is on 07535 68171.

IBM cooks up PC successor

IBM is expected to announce a successor to the PC at the third birthday party of the world's most imitated micro next week.

Belying its reputation as a niggardly host, IBM has invited 1,500 guests to the PC's party, and one commented: 'If something doesn't jump out of the cake, we'll all be surprised.'

What is expected to jump out of the cake is a multi-user system that has gone by the codename of Popcorn for the last year. The machine should use the Intel 80286, big brother to the increasingly popular 80186, and besides its possibilities as a stand-alone machine could also have a role at the hub of a network of PCs and XTs.

But the ever so humble PCjr is IBM's first multi-user micro.

How come? The answer lies in its new keyboard (issue 73). US PCjr users will get the new keyboard free, they won't even have to trade in the old 'chiclet' model — IBM just doesn't want them. So they'll all end up with two keyboards, each of which can function without a cable. Two users will thus be able to sit in different corners of the room competing for the PCjr's attention through the mysterious medium of infra-red.

Thurnall slips Sinclair a disk

Spectrum users starved of storage have been thrown a sizeable sprat by a newcomer to the disk drive scene.

Thurnall Electronics has released a 3in disk drive for the Spectrum at a price of £199, giving 150K storage capacity with no loss of RAM space

The system can be used with both 16K and 48K Spectrums and is attached simply by plugging it into the back and switching on. All the disk commands are very similar to those used with the Sinclair Microdrive system, but they offer much greater speed with full verification on every SAVE.

The disk drive is only available direct from Thurnall at the moment, and until September 30 all drives ordered come with a second free disk. An additional drive is available at £189, and the disks cost £4.69.

Thurnall is hoping to get its product into the shops later this year.

The drives are available from Thurnall Electronics Freepost, Cadishead, Manchester, M30 6DX, tel 061-775 7922.

Games snatched to safety

By Ralph Bancroft

Imagine's 'megagames' — Psyclapse and Bandersnatch — may after all see the light of day despite the collapse of the company (Issue 70).

Imagine's liquidator, Mr Chambers of accountants Arthur Young, McClelland, Moores and Co, said last week that he was negotiating with a number of prospective buyers for the games. 'I have no doubt a sale will take place,' he said.

The games represent a substantial part of Imagine's assets and the Official Receiver had to obtain an order from the High Court to get the games back from Finchspeed.

Finchspeed was the company set up by three Imagine directors — Mark Butler, David Lawson and Ian Hetherington — which bought the rights and equipment associated with the games in the dying days of Imagine.

The transfer has been judged to have been illegal and the games are now in Mr Chambers' hands.

It is likely, however, that only one of the games — Bandersnatch, for the Spectrum — will actually go on sale. Little development is said to have taken place on Psyclapse.

Mr Chambers denied that this was the case. 'One of the games is virtually complete and the other is not so complete,' he said.

Both games involve the use of hardware enhancements for the target machines. The 'dongles' provide security against piracy as well as improving the capabilities of the micros.

A meeting of Imagine's creditors was told that the estimated debts of the company were around £1 million. Mr Chambers said that it will be another week before he can give an exact picture of the extent of Imagine's debts.

Ataris to clear

The writing is on the wall for the Atari 600XL, which is selling for less than £100 barely a year after its UK launch.

Greens at Debenhams in London has hacked £50 off the 600XL's price, adding to Atari's woes as the company adjusts to life under Jack Tramiel (issue 71). But the silver lining for bargain hunters lies in the chance of picking up the 16K colour machine for £99.99.

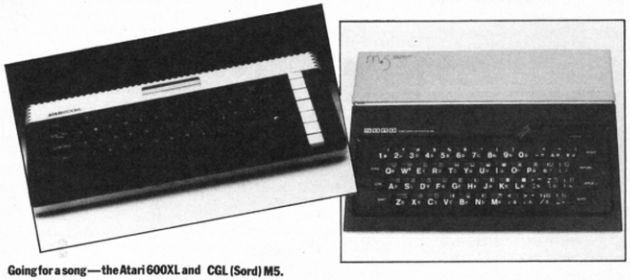
The spec of the 600XL, launched last year to replace the ageing 400 and 800 micros, includes Atari Basic, four sound voices and no fewer than 11 graphics modes.

Also listed in Green's bargain basement is the CGL M5, built by Sord and handled by it and CGL in the UK.

This system is on offer for £49.95, a price that puts it into the same bracket as the Aquarius 1 and that pushes the ZX81 and the Jupiter Ace (issue 73).

The machine comes with 20K of RAM, sophisticated sprite graphics, six octave sound, and four programmable sound channels.

A spokesman from Greens said: 'We're selling off these machines because we're discontinuing them. Other changes are also going to take place since Queensway has taken over — mainly the introduction of other models. And Prism will no longer be supplying us with software.'



Going for a song — the Atari 600XL and CGL (Sord) M5.

Toshiba to lead MSX invasion

The stuttering MSX invasion could be under way within a month, as reports of stock concentrations at Toshiba begin to leak out.

Toshiba now looks the best candidate to be the MSX standard bearer and could be the only one of the Japanese suppliers in a position to sell systems in the UK before Christmas. But it still refuses to put a date on its planned launch.

MSX, the Microsoft-devised home micro standard taken up by most of the major Japanese electronics outfits, has been available to Japanese users for almost 12 months — Mitsubishi started selling machines in October last year. The invasion of the UK was due to begin in September, but in the case of MSX it looks as though the famous Japanese talent for marketing has taken a holiday.

Rumours that the whole idea has been placed in a Sharp microwave oven so that it doesn't arrive here half-baked can be discounted.

U-Micro's Team effort

Despite our attempts to clarify the meaning of the term integrated software (issue 72), confusion still reigns.

U-Microcomputers has just released The Team for the Apple II series. Billed as the company's entry into the integrated software package market, The Team is essentially a very cheap database with line-oriented text editing, graphics capabilities and a calculation facility for reports. At £119 it's considerably cheaper than most professional software for the Apple.

However, it's not what we would call an integrated software package at all. For example, on the text side there's a limit of 200 lines of 80 characters — about 3000 words — and another limitation is the fact that text editing is line oriented. There's no spreadsheet as such — calculations etc are basically database manipulations.

There's integration and integration. Fully integrated software includes fully featured database, spreadsheet, graphics and word-processing — and not just with compatible data files. Stand-alone programs which feature the latter are somewhat further down on the scale and include programs like the QL's suite and those from Practicorp, while programs like The Team belong on the bottom rung of integration.

Even so, The Team shows how the prices of useful software are falling. Even given Practicorp's low price of under £100 per package, The Team represents good value for money as a flexible database.

The Team will be available for IBM PCs running the p-system in September. U-Microcomputers is offering a reduced price of £99 for existing product users until the end of September and the company can be contacted on 0925 54117.

The U-Team — integration in the eye of the beholder.

Competition results

Time to put many of you out of your misery and announce the winners of two *PCN* competitions.

Delving back into the mists of time, you may recall a Lynx competition. Name the 96K Lynx, we said, and we'll give you a machine — five of them, in fact. The 96K model was to fit between the home machine, named the Leisure, and the business machine, named the Laureate.

In the circumstances, the favourite was the Link (no 'missing Link' jokes necessary). Eight of you came up with this name and the first five out of the hat were: Peter Rowley, of Croydon, Surrey; Sandra Clayburn, of Northolt, Middlesex; T M Wildey, of Bexley, Kent; Roy Powell, of Cowdenbeath, Fife; and Mark Putland, of Greenford, Middlesex.

Given the situation at Camputers Lynx, which called in the receiver in June, the planned prizes are going to be a problem. If the above winners would like to contact us, we can discuss alternative prizes.

And in a gesture of unprecedented generosity, we'll be sending consolation prizes to C Matthews, of Newton Aycliffe, Co Durham; R A Perrett, of Yeovil, Somerset; and Duncan Waddington, of Blackpool, Lancs, who also came up with the Link.

More recently, we offered an Amstrad CPC464 with colour monitor to the sender of the correct answers to four questions. There was a massive response to this one — an indicator of the potential success of the Amstrad — and the first name out of the metaphorical hat was Keith Hart, of Hanwell, London.

Still up for grabs — five Commodore 64s must be won.

There were also winners too numerous to mention of the 150 runner-up prizes of games cassettes from CDS. These are on their way now.

The answers were: the original code name of the CPC464 was Arnold, it uses Locomotive Basic and a 6845 display chip, and the Colossus of ancient history was in Rhodes (hard luck the know-alls who mentioned the Colossus computer of Bletchley Park — hardly ancient history, was it?).

■ There's still a week in which to enter our current Commodore 64 competition if you have issues 71 and 72. You won't have time to order them from our back issues department.

VIEW FROM AMERICA

High jump into brave new era of 256K

By Chris Rowley

Have you noticed how things have accelerated as we jump into the 256K RAM era? Many different technologies, hard and soft, seem to be groping together towards a synthesis that may be as revolutionary as the cinema or recorded sound.

For instance, Optical Character Recognition (OCR) machines like the Workless Station from DEST Corporation that can read a sheet of type straight into a micro's memory and onto its screen in 15 seconds through an RS232C port are now priced around $7,000. More advanced OCR devices, priced in the mainframe range of course, can chug through a Bible's-worth of print in an hour. A much cruder $500 unit called Omni-Reader from Oberon International of Texas brings OCR technology to bigger micros like the IBM PC XT.

VidLink from Digital Research (issue 72) consists of a cable and software package to link a Panasonic video disk player, Commodore 64 and television. In addition the noises emanating from the video disk world have the Trumpets of Glory about them lately. A micro on a disk, anyone?

And then there was US Patent 4460958, granted to three RCA workers for a micro system that will go into a top-of-the-line TV and store incoming signals, separate them into a number of components, and remove interference and noise. The system will also allow refinements like freeze frame and has the potential for interfacing to micros.

At the NCC in Las Vegas recently, Interstate Voice Products of Orange, California, introduced the $1,650 Vocalink speech recognition board for the IBM PC. The board uses an Intel 80186 chip and an ASA-16 Audio Spectrum Analyser chip which translates sound waves into digital code. This system still requires a $200 microphone and a pause of 120 milliseconds between each spoken word but a cheaper speech board is promised for the end of the year.

Down on the Sun Belt, where mechanical bulls used to send them flying in the urban honky-tonks, there is a new act in town right out of a Kurt Vonnegut novel. Warner Leisure Inc is installing fully-animated lounge singers, usually called Sammy Sands, which sit behind pot pianos and run through different 15-minute medleys of jokes and Country and Western songs throughout the evening. Sammy is moulded in larger-than-life glass-fibre with a silver lamé jacket and he winks at the audience at the conclusion of each joke. This echoes the Audio-Animatronics show at Disneyland and is the first adult outgrowth of the Family Restaurant business like Warner's eight 'gadget restaurants' where robot Daffy Ducks and Bugs Bunnies entertain the kids over burgers and pizzas.

Charles Platt, science-fiction writer and author of The Whole Truth Home Computer Handbook, predicts that humans might wind up preferring to canoodle with robots programmed to cater for their special needs just as soon as the robots are mature enough to handle it.

Certainly we can expect interactive smut in the next few years. And we can assume that by 1988 the Republican Party Interactive Political Fireside Chat with the President will be on its way to market. There it is; why argue among yourselves when you can talk it out directly with the Pres on your own TV?

Fortunately, the Democratic Party will not adapt as easily to such devices. Despite the appearance of a multitude of computer monitors at the Democrats' convention in San Francisco the word is that many of the delegates never touched the things. The organisers, of course, wore their terminals down to the key connectors.

But the delegates' attitude to the white heat of technology was perhaps pointed up by the contrasting interest in two rival coach tours on the same day — one set of buses travelled south to Silicon Valley, the other north to Napa Valley. The score? Silicon Valley, one delegate, Napa Valley 2,200 delegates. Conclusion: the Democrats had heard that those wealthy vine-growing winery owners in the Napa were all dyed-in-the-wool Republicans and they had to try to convert them . . .

Low marks on schools micros

Too few micros in schools, too few trained teachers, and too little supplementary material — but the authorities are getting to grips with the problems of computer education.

These were the lessons teachers heard at a Microcomputer Users in Secondary Education summer school held at Nottingham recently.

Anita Straker, director of the Microelectronics Education Programme (MEP), said that three out of every four teachers were not adequately trained to use micros in classrooms. Besides this, she added, there were insufficient supplies of back-up material.

There are now 22,250 primary schools with computers, but it is finally being realised that the handy political slogan — 'A micro in every school' — doesn't stand close examination if it means one BBC between 600 pupils. MEP is also now publishing tutorial packs for teachers and trainers to cover mathematics, language development and primary science.

Also on the plus side MEP is taking some notable initiatives to extend the scope of schools' micros. Mike Bostock, technology manager, demonstrated a touch-screen attachment that could soon give a BBC micro some capabilities of the Hewlett-Packard 150. The BBC Buggy, in another sponsored development project, was given rudimentary vision and a robot grab.

The upshot of the conference was that teachers will have to take more of the initiative, particularly where conversion is concerned. Max Bramer of the Open University pointed out that in the not too distant future the BBC, 480Zs and Spectrums will have to be replaced. He called for national software standards and reputable development and evaluation teams to support teachers.

The conference covered such topics as networking, laboratory data capture, music-making, Prolog, LOGO and communicative language work as well as minicourses in Structured Basic, assembly language, and Z80 machine code.

Sentinel strikes note of alarm

Get the strength of the security services around you with a device from Micro-Security that runs off Commodore micros.

Moving with the tide towards useful applications of micros, Micro-Security (PO Box 18, Havant, Hants) has produced a £99 device called the Sentinel Home Security System for use with Commodore 64 and Vic 20 systems. The company intends to develop its box to run with Sinclair and Acorn micros, and cover other domestic appliances.

The unit, an interface under software control, attaches to the user port of the micro via the edge connector — Micro-Security supplies the necessary cabling.

Its software is suitable to either an 8K or 16K Vic 20 or Commodore 64, comes on tape or disk as you prefer, and features menus.

The alarms themselves are a bell for outside the house and a buzzer for inside.

CONVERGING — Datapoint (01-459 1222) has become the latest big-league computer maker to launch a PC, and like Burroughs before it the Texas-based corporation has picked Convergent Technology's 80186 N-Gen to fly its flag. Calling its machine the Vista-PC, Datapoint has made standard some of the features that other makers don't reach — such as a colour monitor with 720 by 348 resolution. There's 256K of RAM and on-line storage can run to 40Mb. The system runs MSDOS 2.11, Convertent Technology's proprietary operating system. CTOS, or GW-Basic, and diagnostics to pin level are included in the base price of £3,750.

Gavilan plugs into UK

The much-delayed Gavilan portable micro has finally made it into the UK.

Distributor Ferrari Software (0784-39911) is selling the basic machine together with plug-in printer and bundled Peachtree software for £2,295 (plus VAT).

The briefcase-sized Gavilan is based on a CMOS version of the 8088 chip and runs MSDOS. The basic model has an eight line LCD screen, 96K of RAM (expandable to 256K) and a single 360K 3½in floppy.

A unique feature of the Gavilan is its touch sensitive panel that allows the user to move the cursor around the screen and select options much in the manner of a mouse.

Ferrari has already started to ship its first machines but it is still in the process of lining up a dealer network. It already distributes the IBM-compatible Seequa Chameleon.

The Gavilan caused quite a stir when it was first announced a year ago with the promise of availability in autumn 1983. However, design and production difficulties in the US delayed its introduction.

It runs off rechargable batteries and comes with an RS232 port and communications software. As a result data can be downloaded from a desk-top micro and carried around. Similarly, data collected on the move can be uploaded.

Gavilan — Ferrari taking on Fords?

Dixons goes into business

As the home micro makers flee into liquidation or business systems, or sometimes both, the high street retailers are following them down the second road.

First WH Smith got serious about business, now Dixons plans to offer you small business systems in 64 of its stores. Its stock will include Sanyo, Apple and ACT machines with business software in tow.

Early offers couple hardware and software. For example, a Sanyo MBC 555 with software that Dixons values at £1,200 will cost £999, plus a free monitor if you buy a printer at the same time — shades of the last days of the Osborne 1. A similar deal is on for the Apricot.

Dixons — with Sanyo, Apple and ACT.

Treble-chance in micros

Roll up, roll up for the latest micro competitions, in which you might win £1,000, a trip to New Orleans, or a colour television. It may not sound as good as a first divvie on the pools, but where's the challenge in picking eight score-draws in the Australian Soccer fixtures?

The details of current competitions are:

Organiser	Closing Date	Prizes	Details
Activision (0628 72448)	August 31	£1,000 £100 to nine runners-up	First out of the hat draw for buyers of a special Pitfall II cartridge
Logitek (0257 426644)	Jan 1 1985	Sanyo 26in colour TV	Buy a Sanyo or Altos micro and rank its features
BCS (01-6270471)	October 20	Represent Europe at New Orleans final	Teams of students will solve six programming problems in a six-hour contest

PERIPHERALS

The new releases

Zenith — putting the PC in perspective.

Joysticks

Dk'tronics (0799-26350) is exploiting its knowledge gained with the Spectrum in the shape of products for the Amstrad, Atmos, Commodore 64, MSX and the QL. First out is a dual port joystick for Oric micros at £14.95. A new programmable joystick interface for the Spectrum is available from CCI (0799-25014) at only £15. It has its own on-board RAM, saving valuable memory space for programs.

Monitors

The ZVM-124 is a not-so-low cost monochrome monitor from Zenith (0452-29451) for the IBM PC and other micros. At £128 (plus VAT) it has a 22Mhz bandwidth, 900 pixel horizontal resolution and easily accessible front mounted controls.

Printers

If you have an Olivetti Praxis, Silver Reed or Brother typewriter help is at hand to hook it up to a micro. Timtom (39 Bryn Gwyn, Caerphilly, Wales) has a £77 interface and buffer that links into an RS232 interface. Data Products (0784-31161) has a new range, called the 8000, of Paper Tiger printers. It can offer 80 column and 132 column printers that print in monochrome or colour, with print speeds up to 400 cps in a variety of typefaces. Triumph Adler (01-250 1717) is jumping onto the low-cost daisy-wheel bandwagon with the TRD 7020. It costs £375 and prints at 20 cps in 10, 12, 15 or proportional pitch. It will be available through Boots.

Timtom — side-door printer interface.

EPROM kit from Camel.

Disks

Floppy disks get full rather quickly: when hard disks do get full you can't change them. Apstor (0273-422512) overcomes both hurdles with its removable cartridge, hard disk systems. Its latest offering, the Gamma 20, gives you a 20Mb hard disk and a 20Mb removable cartridge. Micro Memory Systems (0734-744225) can also offer 40Mb. In this case it's all on one hard disk, the Magnum, which can interface with a number of leading micros. It costs £2,425 and has a 30 millisecond access time.

Interfaces

One drawback of Sinclair's QL is its lack of a Centronics port. Fortunately, Cambridge Systems Technology (0223-323302) has stepped in with its Q-Pi, a Centronics interface that plugs into the QI expansion socket. Inmac (09285-67551) has an RS232/Centronics protocol converter, but at £125 you might just find it a bit too expensive, even with its built-in 2K buffer. WD Interfaces (0532-864328) has a keener sense of prices. Its PortCom programmable controller for the BBC B is priced at £99.95 and allows you to use the micro to control two mains outputs and two DC (up to 50 volts) outputs.

EPROMs

Cambridge Microelectronics (0223-314814) has launched a range of EPROM products for the Spectrum. Included in the list are EPROM boards, EPROM blowers and EPROM erasers.

PCN CHARTS

GAMES

NEW WEEKLY CHART! NEW WEEKLY CHART

			GAME TITLE	PUBLISHER	MACHINE	PRICE
▲	1	2	Full Throttle	Micromega	SP	£6.95
▼	2	1	Match Point	Psion	SP	£7.95
▶	3	3	Sabre Wulf	Ultimate	SP	£9.95
▶	4	4	TLL	Vortex	SP	£5.95
▲	5	6	Lords of Midnight	Beyond	SP	£9.95
▲	6	7	Jet Set Willy	Software Projects	SP	£5.95
▼	7	5	Beach-head	US Gold	C64	£9.95
▲	8	17	Stop the Express	Sinclair	SP	£5.95
▼	9	8	Arabian Nights	Interceptor	C64	£7.00
▶	10	10	Jack & B'Stalk	Thor	SP	£5.95
▼	11	9	Mugsy	Melbourne	SP	£6.95
▶	12	12	Psytron	Beyond	SP	£7.95
▲	13	14	Trashman	New Generation	SP, C64	£5.95
▲	14	21	Loco	Alligata	C64	£7.95
▲	15	22	Encounter	Novagen	C64, AT	£8.95
▲	16	20	Fighter Pilot	Digital	SP	£7.95
▼	17	16	Cavelon	Ocean	SP,C64	£5.90
▲	18	—	World Cup	Artic	SP	£6.95
▼	19	13	War of the Worlds	CRL	SP	£5.95
▼	20	18	Micro Olympics	Database	SP, C64, AC	£6.95
▲	21	28	Son of Blagger	Alligata	C64	£7.95
▼	22	15	Hulk	Adventure International	SP, C64, AC, AT	£9.95
▲	23	—	Tank Duel	Real Time	SP	£5.50
▼	24	23	737 Flight Path	Anirog	Vic, C64	£7.00
▲	25	29	Frak!	Aardvark	AC	£7.50
▲	26	—	Zaxxan	Star Zone	SP	£5.95
▲	27	—	Code Name Mat	Micromega	SP	£6.95
▼	28	11	Valhalla	Legend	SP, C64	£14.95
▲	29	—	Aviator	AcornSoft	AC	£9.95
▲	30	—	Caverns of Khafka	US Gold	C64, AT	£8.95

MICROS

Top Ten over £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	IBM PC	£2,390	IBM
▶2	2	Apricot	£1,760	ACT
▲3	7	Compaq	£1,960	Compaq
▼4	3	Apple III	£2,755	Apple
▶5	5	Televideo TS1603	£2,640	TH
▲6	8	Wang Professional	£3,076	Wang
▼7	4	Sirius	£2,525	ACT
▲8	—	Kaypro	£1,604	Kaypro
▶9	9	Philips P2000 c	£1,484	MD,KDS
▲10	—	NCR Decision Mate V	£1,984	NCR

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶1	1	Spectrum	£99	Sinclair
▶2	2	Commodore 64	£199	CBM
▲3	5	BBC B	£399	Acorn
▶4	4	Vic 20	£140	CBM
▼5	3	Electron	£199	Acorn
▲6	7	Memotech 500	£250	MTX
▲7	—	Amstrad	£229	Amstrad
▲8	9	Oric	£99	Oric
▼9	8	Atari 800XL	£250	Atari
▶10	10	Dragon	£150	Dragon

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **August 8.** The games chart is updated every week.
Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT.
Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.
PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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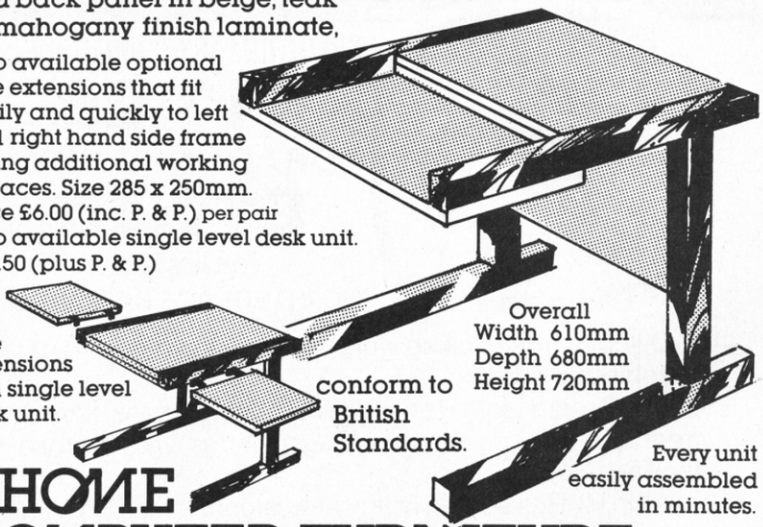

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..... Side Extensions at £6.90 per pair (inc. P. & P.) ☐ Beige ☐ Mahogany ☐ Teak

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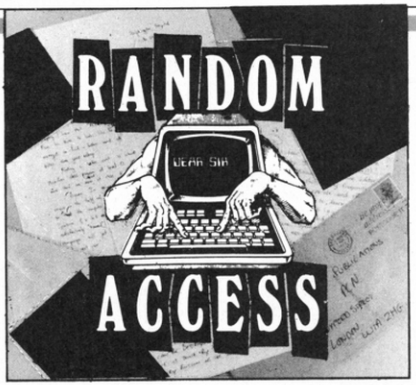

Would you like to see your name in print? Here is your chance on *PCN*'s letters page.

The QL is worth waiting for

The QL is here! I ordered it in the middle of February and received it on the 22nd of June (promised delivery date at end of June). It came with the revised operating system 'AH' stored internally (*ie* no kludge) and seems to have most bugs corrected.

The Basic and Microdrive access seems to have been considerably speeded up. Quill (80K) loads in 30 secs rather than 2 minutes as on the pre-production model. It came with a comprehensive User Guide with beginners guide and keyword dictionary, etc.

One tip that I've found is that pressing CTRL and F5 during listing acts as a stop/start toggle. I've managed to interface my Brother EP-22 with built-in RS-232C with the QL — it requires OPEN #3,serlc and 300 baud to print to channel 3.

SuperBasic highlights structure and puts BBC Basic in the shade. I was also impressed by the speed of the graphics and flexibility of their syntax. The Psion packages seem to be tremendously good value, utilising power with a good user interface.

All in all, the QL (in my view at least) deserves all the success it will no doubt receive.
R Snowdon,
Newton Aycliffe, Co Durham.

Now how about sending us some QL Microwaves . . .? — Ed.

The limitations of a listings mag

Can I say how much I agree with the comments made by L Rumens (issue 70) concerning the way so many magazines concentrate on so few machines?

Presumably, the volume of sales for general interest magazines isn't all that high. And while I'm posing a few questions: why do so many magazines features so many listings? Is it that too few people are getting to grips with the effort and thrill of writing their own programs?

Obviously, there are *some* programmers out there, but I wonder what proportion of home micro owners are content to run or type in other peoples' programs?

Why do so few magazines feature really good, long term series about the skills and possibilities of programming?

Encouragingly, the recent Yorkshire TV series, *Me and My Micro* may have initiated this type of development.

How about you giving us *your* view? Are we, your readership, really that unwilling to read anything that is not aimed fairly and squarely at the machines we already own? Are we really only interested in game-playing?

You provide a fair spread of reviews, articles and listings. Do *you* find that the pressure is upon you to feature only the most popular machines? What future do you see for, say, Amstrad or Memotech as regards magazine support? Are owners going to have to hope that enough people buy the machines to make it viable for a publisher to bring out a dedicated magazine?
Alan Sturgess,
Keighley Yorks.

Yes, listings are extremely popular, and obviously we have to cater for the most popular machines. But we do also try to cater for minority tastes like Amstrad, Memotech, Colour Genie — and even Espon HX-20 — Ed.

Atari attack — for cheaper software

I have leafed through all my copies of *PCN* and have come across numerous complaints regarding the dearth of cheap Atari software in Britain.

As an Atari owner, I would like to put in my penny's worth.

Software houses in Britain produce all sorts of programs for British micros. Why can't they divert some of their programmers onto Atari software? It would be a boost to the British economy as well as encouraging Atari buffs to buy British.

To be fair, we must sling some mud at Atari itself and the retail trade. They believe that we Atari owners are descendants of Solomon and are heir to his fabled treasure.

I am airing my views because I and other Atari owners in Norway are being kept from getting full use of our micros due to the lack of software. I have tried to purchase software by mail order from retailers who advertise in *PCN* as the ones with the largest inventory list of Atari software in the UK only to have my cheque returned to me because they did not have the advertised item.

I just wonder what Atari thinks? Wake up Atari, you owe your customers. Maybe you can learn something from Commodore who encourages cheap third-party software.

I just hope that it does not turn out to be a case like that of the Oric 1 where customers had to turn to the press with bad publicity before something was done.
James Ng
Valestrandsfossen, Norway.

Acorn's second processor points

Simon Horner's review of the Z80 second processor package for the BBC Micro contains a couple of inaccuracies which I feel could be made clearer.

Firstly, Nucleus is not a report program generator. It does, in fact, generate Basic programs not COBOL.

Secondly, Forms 2 is the name of the COBOL screen aid utility.
T Hohenberg, Acorn Computers, Cambridge.

Oric — trials and tribulations

After reading about the experiences of R Willis (Issue 72) with Oric products I felt prompted to tell my story.

After much hesitation between buying a 16K Oric 1 or 16K Spectrum, I decided in May 1983 to order on Oric and after four weeks it arrived. It worked fine for a month then died a sudden death.

The computer was returned for repair. Four weeks went by and I decided to inquire about its state of health and was eventually informed that a computer destined for repair was never in their hands for more than two weeks. Mine had already been there for four weeks and it was a further two weeks before it was returned.

This little gem of a micro worked for an amazing six days. I sent it back with a letter requesting a refund. They, of course, ignored this request and sent back a letter saying that they do not give refunds. The Oric came back a while later.

After two more similar occurences I demanded a refund or I would take them to court. The refund arrived on the day we were to go to the County Court to start proceedings.

My advice to R Willis is to keep plugging away.

With the refund I bought a Spectrum.
Martin Smith
Reading, Berks.

Interfacing a LX 180 printer

Further to the query (issue 69) on connecting a LX180 printer to a BBC or Newbrain AD, there are three points to consider: first the LX180 is not centronics standard. The data lines are inverted *ie* logic is 0 volts.

Secondly all lines should be buffered to prevent possible damage via paralleled pull-up resistors.

Lastly the LX180 is a synchronous printer — characters must be ready to be sent at 5.5ms intervals or less — as requested by the printer.

The first two hurdles can be overcome with a small circuit inserted in the cable and powered from printer or computer. But the third could be a problem if the computer does not respond to AC knowledge from the printer, (called PEC by the LX180 — Strobe is CT).

I have also just interfaced a LX180 to my Dragon. The Dragon is one computer which does not respond to ACK. My LX180 has a 256 character buffer and the interface consists of the data inverters line buffers and two one-shots. The first of these produces a busy signal and this is gated with the buffer full signal to produce BUSY which goes to the computer. The second one-shot stretches the very short STB of the Dragon to ensure the LX180 does not miss a character.

An easier way, which will work without the buffer board as well, involves setting a flip-flop with STB from the computer and resetting it with ACK from the printer. The flip-flop output is used to control the computer BUSY line.

Of course, if your computer does respond to ACK, there is no problem.
David Philpott,
Chaddesden, Derby.

WRITE TO: Random Access, *Personal Computer News*, VNU, Evelyn House, 62 Oxford Street, London W1A 2HG.

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Lost in a maze of bits and bytes, trapped in a forest of errors, bugged by Basic? Whatever the problem, CALL on us. Our panel of experts is at your command.

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Stop your Amstrad from spacing out

Q I have managed to link my Amstrad CPC464 to a Seikosha GP80A, and though the system works I can't solve the problem of double line spacing. I've tried using the WIDTH 255 command which should stop the Amstrad sending the carriage/line feed combination, but to no avail.

Is it possible to solve the problem with a software routine?
P Stephenson,
Elvington, York.

A The extra line may be caused by the Amstrad sending a line feed/carriage return combination, even though it's not supposed to.

On the other hand, it could be something to do with one of the pins being pulled low (grounded), thus turning on the auto line feed facility of the Seikosha.

You could try cutting the wire which carries this command, usually pin 14 and called AUTO FEED XT, but check exactly which one it is in your printer manual first. All you need connected between Amstrad and printer are the eight data lines, strobe, ACK and the ground lines.

If this doesn't work, contact Amstrad on 0277 228888 and Amsoft is on 0277 230222.

Keeping colouring under control

Q Could you give me any hints about using serial attributes on my Oric 1? I'm trying to produce coloured pie charts on the HIRES screen using the FILL command. The problem I have is that after drawing the circle, the control codes for colours appear in black between some of the segments — those which meet in any plane except horizontal. I can't work out why or how to get round the problem.
L Bancroft,
Cambridge.

A The following routine shows how FILL can be used to produce curved areas of colour, without getting a black area between them:

```
10 HIMEM &97FF (&17FF FOR
   16K)
20 HIRES
30 CURSET 0,0,0
40 FOR COLOUR = 1 TO 4
50 CURSET COLOUR * 30,0,0
60 FOR F = 0 TO 10
70 CURMOV F,1,0
80 FILL 1,1,COLOUR +16
90 NEXT:NEXT
100 GET A$:TEXT:LIST
```

Understanding how this works may help you sort out your programming problem. Your description isn't very clear, but another difficulty could be caused by drawing the circle. The example program uses background colours only, so try using PAPER or background attribute codes alone (those between 16 and 23): don't put any character codes in the chart.

Yet another reason for the black areas may be that your program is FILLing incorrect areas, so try PEEKing the screen locations (between 40960 and 49119 decimal) to find out exactly which attribute/character codes are there. Mapping out the screen's contents might be of use because you can see where the problem is. You could then add a few POKEs of character or attribute colours to these relevant screen locations.

Guessing games with the QL

Q I've been thinking of buying a new micro for a month or so, and have nearly decided on a Sinclair QL. By 'nearly' I mean that I have only seen it in its business light, and not as a home micro for the programmer/gamer.

Could you tell me if there is likely to be a substantial amount of games software for the QL, and could you explain how I could benefit from the QL's SuperBasic?
Paul Edwards,
Camberwell, London.

A You shouldn't assume the QL will turn out to be a business machine. Sinclair was surprised that the Spectrum turned out to be a games machine, and has virtually abandoned predictions about the role of its machines. Clive and Co seem simply to have pointed the beast at the great British public and crossed their fingers that a couple of million of them will buy it.

Undoubtedly the QL will be used for business, but *PCN*'s prediction is that most of the business use will be on versions of the machine using the QL's circuit board and manufactured by third party suppliers.

As far as games are concerned, a lot of software houses claim to be working on them at the moment, and once programmers have a thorough knowledge of the 68008's capabilities, there should be some pretty spectacular stuff about.

As for SuperBasic, it all really depends on whether or not you're a structure nut — the types you see in Pascal T-shirts, propping up the bar of the Festering Firkin, sipping their pints of Old Ratskin, stroking their lank beards and smoothing their thinning hair.

If you're a fully paid up member of the Campaign For Real Programming you'll appreciate SuperBasic's use of procedures and virtual outlawing of GOTO, but you might be one of the shrinking band of lager drinkers who actually prefer writing unstructured and unintelligible programs.

If you are, don't panic, as it's possible to hack away in a reasonable simulation of Spectrum Basic within SuperBasic, and add SuperBasic structures as and when you need them. And as you drink your lager, you can console yourself with the fact that at least you're not a structure bore . . .

Nice ZX81, shame about the tapedeck

Q I recently got a ZX81, and I'm delighted with it. My only problem is with my tape recorder, which is a Sanyo. It seems only to load games that I buy in shops, and refuses to load any programs that I've saved. I've tried everything, for example, new cassettes, a tape cleaner and moving it closer to the TV, but nothing seems to work. Please help.
Andre Foley,
Co Tipperary, Eire.

A We assume you've tried all possible volume levels, and that you've disconnected the Ear cable, while you're saving through the Mic socket. If you've tried these, then it's either your ZX81 giving an inadequate output or your tape recorder is bust.

ZX81s are temperamental anyway, but if you've no problems with commercial software and nothing but problems with your own, it sounds like faulty machinery. Try different tape recorders, and if you have a friend with a ZX81, try loading one of their programs on your own machine, with your own tape recorder.

If this loads, then your ZX81 isn't saving properly, while if a different tape recorder works, then it's your tape recorder that's causing you grief.

Hard to get help from an Oric call

Q I want to transfer text files from an Oric Atmos to an HP150. Is this possible? What I have in mind is 'printing' the data from the Oric's Centronics port to either the RS232 or the IEEE port on the HP.
G Wright,
Ware, Herts.

A Do what? Pause for raucous laughter. You don't say how the 'text file' is stored in your Atmos, and quite why you'd want to transfer anything from an Atmos to an HP is beyond us.

If it will help you out at all, we'll swap you *PCN*'s Oric 1 for the HP . . .

Probably the simplest way to do what you want is to use the printer port as an RS232 device. This will involve making up a cable and writing a machine code program to set up and manage the VIA 6522 chip. You'll need to get thoroughly familiar with the 6522 specifications, RS232 protocols, assembly language and electronics. It's easy when you know how, but you really will have to put in quite a lot of work on the technical front beforehand. At the HP end there'll have to be a comms package to access input from the HP's RS232 port.

Of course, life would be a lot easier for you if Oric hadn't scrapped its advertised plans for a modem, which would have had the interfacing and software.

Oric is on 0990 27641 and is supposed to have a direct line to a technical service on 01 755 0811.

Mind you, we've never been able to get an answer from this number . . .

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IDEAL IDEAL is an Interrupt Driven Extendible Animation sub-Language. Once you have mastered IDEAL's easy to learn set of over 80 commands and just a little FORTH, you will be ready to produce arcade-quality games even if you don't know machine code. Up to 255 Sprites, each with its own user-defined dimensions can be moved around the screen (or memory), scrolled, spun, reflected enlarged or inverted with amazing speed and smoothness. Operations are possible between screen windows, Sprites and Sprite windows. Sprites can even stretch across several screens, so those difficult scrolling landscapes that form the basis of so many games are easy to achieve. Sinclair's own sound and graphics commands such as CIRCLE, DRAW and BEEP are fully supported, and there are some unique collision detection facilities.

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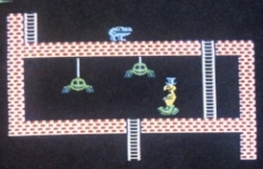

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What is more, programs written in FORTH/IDEAL will be highly portable between the Spectrum and implementations under development for other popular micros.

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The BBC Micro has now taken a giant step into the world of business computing.

With the addition of its new Z80 second processor, it is the first computer at anywhere near its price to become fully compatible with CP/M software.

As most business computer users can verify, CP/M is the most widely used form of software in business today.

For £299, you're well and truly in business.

At £299, the Z80 adds 64K of usable RAM to the BBC Micro. And it allows you to use the CP/M 2.2 computer operating system.

It's extremely fast.

And besides giving you access to a vast new area of software, it enables you to use GSX graphics–based programs, the perfect complement to the BBC Micro's own superb graphics.

Free software and languages.

The Z80 second processor comes complete with five CP/M business programs.

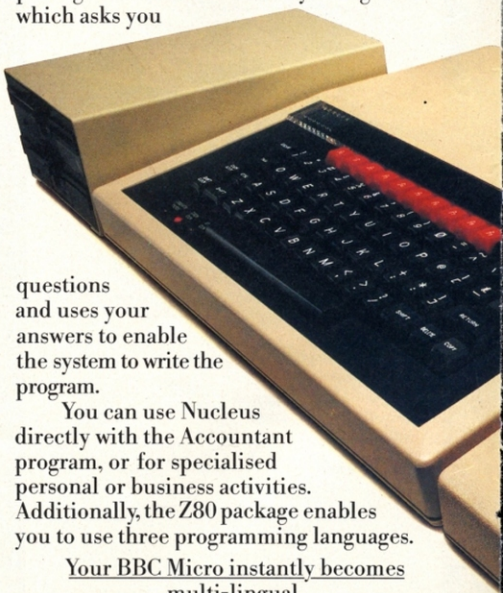
To handle your word processing, there's MemoPlan. It's a program with some highly sophisticated features, such as a safeguard against data loss through power cuts and the ability to show two documents simultaneously on the screen.

To form your CP/M personal database, there's FilePlan. It stores names, addresses, telephone numbers, stock listings and more. And if you use it with MemoPlan, you can generate personalised letters, labels and mail shots.

To produce forecasts and analyse groups of figures diagramatically, simply use the GraphPlan program. This is incredibly helpful in working out vital business calculations, converting them into graphs and charts.

Meanwhile, in the book-keeping department, there's the Accountant program. Use it to enter day-to-day transactions into the computer. Then, at any time, you can ask the computer to produce lists, summaries, reports, audit trails and trial balances. You can readily expand this package to a fully ledger based system, complete with payroll and more.

Finally, to help you to develop your own programs without having specialised experience, the Z80 comes with another software package called Nucleus. It's a system generator which asks you questions and uses your answers to enable the system to write the program.



You can use Nucleus directly with the Accountant program, or for specialised personal or business activities. Additionally, the Z80 package enables you to use three programming languages.

Your BBC Micro instantly becomes multi-lingual.

To simplify writing your own software with the Z80, there's BBC BASIC.

For running professionally written business programs, there's Professional BASIC.

And then there's CIS COBOL, the leading microcomputer version of COBOL, the language used in mainframe computer applications throughout commerce and industry.

With CIS COBOL, the Z80 also gives you two sophisticated programming aids.

Macro.

One is Animator, an award winning debugging tool which enables you to identify programming errors quickly and easily.

The other is FORMS 2, which helps you to write your own interactive programs in COBOL.

With all these sophisticated features, the Z80 package is exceptional value for money. Indeed, bought separately the programs and languages could cost as much as £3,000.

See the Z80 at work.

The Z80 second processor is designed to be used with the BBC Micro Model B incorporating a Series 1.2 Machine Operating System and linked to a dual 80-track disc drive, a printer and monitor.

Ask your BBC Micro dealer to show you just how far it can go in the world of serious business computing.

For your nearest dealer, ring 01-200 0200.

Technical specification.

The Z80 has a 64K Random Access Memory, running CP/M 2.2 which provides approximately 55K bytes of RAM for user programs. It operates at a clock rate of 6MHz. Power supply is integral. Height, 70mm. Width, 210mm. Depth, 350mm.

The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

In Strathclyde they're turning living rooms into recording studios. Harriet Arnold listened in.

The means justifies the end

Technically it's brilliant . . . the only problem is that none of us can play it!

When asked to help interface a BBC to a music synthesiser, soldering iron toting members of a Glasgow-based club magnified the challenge. It's not too surprising that they designed from scratch as far as possible, as many have built home-brew systems.

'We made it a mind-bending hardware exercise,' said Strathclyde Computer Club chairman John Baraclough. 'We try to get other members interested in the nuts and bolts of computing.'

The result turns a living room into a recording studio. The BBC is used to display and edit music before playing it through the synthesiser. There's also the facility for using a multi-track tape recorder to build up layers of music as the computer enables pin-point accuracy in matching the different layers with a timing track.

The means has been a 'handful of components', plenty of electronics expertise and even more patience, says Mr Baraclough.

The first stage involved building a D/A converter board and acquiring a circuit diagram to work out what the interfaces should be. That, along with making the software do the right thing at the right time, were the main hurdles.

The cost of such a project veers between the affordable — the D/A converter board cost about £25 — and the too expensive. An oscilloscope, for instance, had to be borrowed.

More details of club projects from John Baraclough (0360) 50951.

MICROWAVES

More hints and tips from our readers to make programming a little easier.

You all know the feeling: after hours, days or even weeks spent on a particular problem you suddenly see the answer. Or on one of those late-night expeditions through the memory map you find some undiscovered feature. Well don't keep it to yourself — send it here. We pay £5 for every tip and routine printed and £25 for a genuine Megawave.

Send your contributions to: *Microwaves, PCN, 62 Oxford Street, London W1A 2HG.*

Quick-change Beeb colours

For a short cut to change the background colour on a BBC micro, type VDU 19, followed by a carriage return. Then hold down any numeric key until the background colour has changed, *eg* 1 for red, 2 for green, and so on.

It works in every mode except modes 1,2,7. For flashing colours beyond 9, use VDU 19,0. in place of VDU 19.

D Sayed, London W5.

Cleaning up on BBC windows

The ability to define multiple text windows on the BBC computer, despite the fact that only one can be active at a time, is put to use in many programs.

When designing a program, it is difficult to visualise the exact extent of the window being defined. This can be overcome by changing the character used to fill the current window on execution of a CLS command.

This character is by default the space character &20, hence the 'clear' window.

Changing this to &FF, the block character, fills in the window. This character is stored in the VDU work space in location &358.

Try typing the following:

```
?&358 = &FF
VDU 28,5,20,35,5
CLS
```

The extent of the window is now clear to see. Note, though, that changing modes resets both the character and the text window to their default values.

David Abbott, Horsham, Sussex.

Define those Oric sound commands

```
10 FOR X=#400 TO #415
20 READ R : POKE X,R : NEXT
30 DOKE #2F5,#400
40 DATA #A2,#8          'LDX $8  (data file - low)
50 DATA #A0,#4          'LDY $4  (data file - high)
60 DATA #20,#6C,#FA     'JSR $FA6C (main routine)
70 DATA #60             'RTS
80 REM HERE COMES THE 14 BYTE DATA FILE
90 REM CHANGE THE VALUES IF YOU LIKE
100 DATA 206,100,231,36,137,112,70,102,170,
    239,83,246,12,165
```

While looking through the ROM of my Oric 1, I found the addresses of the machine code routines for ZAP, PING, EXPLODE and SHOOT. These four routines all work in the same way: before making a JSR to the main routine, index-x is loaded with the low order byte and index-y is loaded with the high-order byte of the start address of the 14 bytes long data file which contains the parameters required by the main routine.

This main routine is the same for all four of the predefined sounds, and only the 14 parameters make the sounds sound different. The routine is located at #FA6C.

This can be used to create your own user defined sound commands, for instance by making use of the extension command "!". By DOKEing the start address of a machine code program into location #2F5, this program will be executed whenever ! is entered as a Basic command. This program POKES the machine code routine required into memory locations #400 and upwards.

Once the program has been run, enter "!" and press Return. Many different sounds may be generated — depending on which values have been chosen as parameters.

The addresses of the predefined sounds in the Oric ROM are:

PING:	$FA85	ZAP:	$FAC7
SHOOT:	$FA9B	keyclick:	$FB10
EXPLODE:	$FAB1	ctrl key:	$FAFA

Bjorn M Ursfjord, N-4040 MADLA, Norway.

All the text that's fit to output on a Spectrum

This short Spectrum routine can be added to Tasword to give nearly A4-size sheets of text from an Alphacom printer.

The routine prints out the left-hand side of the complete text file, LPRINTING 20 times after 80 lines to separate the pages. The right-hand side is then printed out. After cutting roughly half-way through the spaces between pages, the left side of a page of text should be overlayed on to its corresponding right side and the text carefully lined up. Slice through the two, preferably using a sharp, single-edged razor blade and a steel rule. If this can be done with the printed side of the paper face-down, a nearly invisible join can be made. The two sides can then be joined with invisible sticky tape (on the back of the sheets) or glued directly on to an A4 backing sheet. The top and bottom of all the pages can be trimmed together to ensure a uniform size. The results are very reasonable if done neatly and are certainly good enough for your own use. The only drawback to the method is having to splice each page together so it is probably unsuitable if you do a lot of printing.

In the Tasword listing insert "GOTO 8000" after the CLS statement at the beginning of line 200. This diverts the print routine which is called from the normal Tasword menu presented after STOP (not the ZX print routine called from Extended mode). Then add the print routine listing.

B Cavers, London E12.

```
8000>LET X=32000: LET Y=1: LET L
INE=2: GO SUB 8100
8010 LET CHAR=0: LET LINE=1: LET
 A$="": FOR N=X TO X+A: LET A$=A
$+CHR$ PEEK N: LET CHAR=CHAR+1:
IF CHAR=32 THEN LPRINT A$: LET L
INE=LINE+1: LET A$="": LET CHAR=
0: LET N=N+32
8015 IF LINE=81 THEN GO SUB 8100
: LET LINE=1
8020 NEXT N: GO SUB 8150: GO SUB
 8100: LET X=X+32
8050 IF Y=2 THEN RUN
8060 LET Y=2: GO TO 8010
8100 IF LINE>1 THEN FOR M=1 TO 2
0: LPRINT : NEXT M
8110 RETURN
8150 IF LINE>1 THEN FOR M=LINE T
O 80: LPRINT : NEXT M
8155 RETURN
8200
8210
8220 REM    X = START ADDRESS
8230 REM        FOR TEXT
8240
8250 REM    Y = FLAG TO LIMIT TO
8260 REM        2 PASSES (LEFT &
8270 REM        RIGHT OF TEXT)
8280
8290 REM    A = LENGTH OF TEXT -
8300 REM        (APPARENTLY
8310 REM        TASWORD'S OWN
8320 REM        VARIABLE)
```

Exclamation mark aid for an Atmos reset

An interesting Microwave from R F Harvey in issue 69 of *PCN* allowed the Oric Atmos function key to work in the same way as the reset button on the underside of the machine. However, it may be a nuisance to have to type in POKE #24A,#4C every time the key is used to re-enable the routine, so I have redefined the exclamation mark (!) to carry out this task.

Run Mr Harvey's program and then type in the listing.

```
10 MEM = #412
20 FOR N=0 TO 5
30 READ DA$
40 POKE MEM+N, VAL("#" + DA$)
50 NEXT N
60 DOKE #2F5,#412
70 END
80 DATA A9,4C,8D,4A,02,60
```

Once this has been RUN, type in NEW, then when the key has been used, the exclamation mark will re-enable the routine.

Richard Wood, Lindley, Huddersfield.

Five IBM-compatible tomes are weighed up by Gill Esson in *PCN*'s regular look at the new books.

It can only be a matter of time before somebody realises that IBM-compatible bookcases are the commodity to be in. Here is another bunch of five books for PC users.

'Handbook of Basic for the IBM PC' by David L Schneider, published by Brady/Prentice-Hall at £17.95 (paperback, 499 pages).

There's no beating about the bush from Mr Schneider; you only have to turn the front cover to start getting value for your £17.95. The inside cover lists important numbers, useful ASCII values, a mode guide and a space to enter your favourite colour combinations.

Without further ado the book moves into a run-down on the nature of variables, file types and the like, and then gets stuck into Basic. Very much a reference book rather than a primer, it takes the expressions in alphabetical order — if you try to read it sequentially instead of by random access you'll find yourself tangling with arctangents, double precision constants and trapped communications events before such elementary features as the DATA statement.

Each expression is dealt with separately, but through subheadings it is shown in context and related to other Basic keywords.

But different aspects of programming — editing and debugging, for example — only surface in piecemeal fashion and the index doesn't guide you to them.

The other side of the coin is that the book is very strong on illustrations, program examples and appendices. Overall it is brisk, businesslike and to the point. It assumes some preliminary knowledge of Basic but should be lucid enough for most users.

'IBM Basic' by Donald T Payne and William R Beck, published by Spectrum/Prentice-Hall at £14.35 (paperback, 234 pages).

This book, by contrast, is for the beginner and the inside front cover is reassuringly blank. But the reason becomes quickly apparent. Messrs Payne and Beck have nothing new to say.

Worse still, what they do say approaches English only tentatively. 'Doing Basic,' we learn, 'is a skill, not a recall task.' And: 'As you can consider learning Basic, you may be wondering what a computer language is like.'

Banish your wonderings, the answer is at hand. 'A computer language is similar to a natural language in many ways,' they begin helpfully. But don't get overexcited — 'On the other hand, computer languages are also very different from natural languages.'

The book abruptly becomes appealing by introducing DRAW at an early stage, using playful example programs, graphics and colour. It deals with expressions according to the type of function they perform, and the standard chapter format — aims, means, problems and solutions — is unoriginal but useful. The authors eventually gain confidence; from being careful not to intimidate those with 'weak math skill' they gradually realise that their readership might not, after all, be stuck at the intellectual level of the slow loris.

But there are other weaknesses, particularly with appendices — there isn't even a presentation of the IBM character set.

Buy half a dozen Len Deighton instead.

'IBM PC and XT Owner's Manual' by Barbara Lee Chertok, Dov Rosenfeld and James H Stone, published by Brady/Prentice-Hall at £13.45 (paperback, 200 pages).

There used to be a book for DIY motor mechanics, the superb Car Doctor A-Z. This PC manual might be as close an equivalent as you will find for IBM micro owners.

It is an aggressive introduction to running a micro. If at times it seems too uncompromising, this is because the authors apparently regard operating a micro as no less serious a business as keeping a car roadworthy. They are not the kind of people to use a pair of tights as a temporary replacement for a fan belt.

The only relaxation in this discipline comes when they speak in hushed tones of IBM itself. Their awe is understandable — IBM and its PC must be one of the world's most successful job creation schemes.

Other criticisms of the book are minor, and verge on carping. It can surely not be necessary to repeat at the foot of each page the information that underlined words are defined in the glossary. Nor does their assertion 'This is a doing book' hold much water — it is a common feature of micro books that they are intended to be used in conjunction with the micro itself.

That apart, it is a well-written, well-constructed companion to the PC and XT documentation.

'Inside the IBM PC — Access to Advanced Features and Programming' by Peter Norton, published by Brady/Prentice-Hall at £16.95, £63.54 with diskette (paperback, 262 pages).

With a sinking feeling you find from Mr Norton the same reverential attitude towards IBM that draws some of the sting of the previous book. However, knowing your subject is more important than loving it, as long as you can separate the two, and Mr Norton can. He writes about the PC with enthusiasm, confidence, and verve.

It is primarily a volume for programmers, and fairly ambitious programmers at that. The two disks that add almost £50 to the price hold more than 120 programming tools, and they come with their own documentation. As with the body of the book, they claim to be pitched at users of intermediate prowess but look a rung or two higher on the sophistication ladder.

Inside the IBM PC warms up over the first five chapters — introduction, hardware, memory, DOS and diskettes — and steps up the pace from chapter 6, 'Access to ROM'.

The book generally looks dull and authoritative but it is in fact lively and authoritative. The index is more than adequate and the appendices are the best of those to be found in this crop.

'Advanced Basic and beyond for the IBM PC' by Larry Joel Goldstein, published by Brady/Prentice-Hall at £17.95 (paperback, 360 pages).

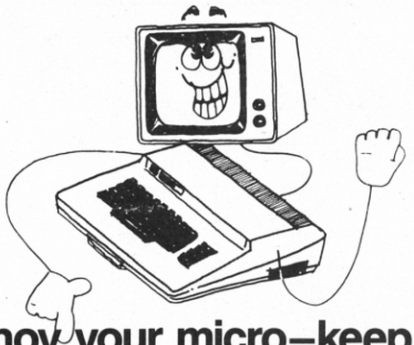
Another book for programmers, this might almost have been entitled 'What do you say after you've said Hello to the IBM PC'.

Mr Goldstein gets a disingenuous reference to one of his earlier books out of the way in the opening chapter and sets off in pursuit of that elusive quarry, sound programming practice.

His approach is to take a leisurely stroll through various aspects of programming with the order determined largely by the type of input/output devices you might be using. This is novel, but sensible, as long as the application being developed demands a particular type of peripheral. At any rate it is an improvement on the alphabetical-order approach.

It covers a lot of ground rarely noticed by many general books; there are sections that relate the IBM PC to specific peripherals, frequent little wrinkles to take some of the donkey work out of programming, and a variety of sample programs with different styles to make different points.

Some of the illustrations seem to be included to break the text up rather than to enhance it, and the drawing of two light pens is particularly fatuous. Interruptions to test your understanding are frequent but you can always ignore them. All in all, this is a doing book or a not doing book, as you see fit.



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Pitman

An easy way to produce double-height characters on your Commodore 64 from Ian Metcalfe.

Tall stories

The Commodore 64 is highly versatile in the manipulation of graphics and the use of alternative character sets. But often a program isn't complex enough to make it worth your while going to the trouble of producing a new user-defined character set just to produce a better layout.

This utility, D HEIGHT.PAK 64, provides a simple and effective way to produce double height characters on the screen.

Layout and use

The program is organised as four subroutines with line numbers from 60000 onwards; they'll usually be easy to merge with your own programs. The routine from line 60000 to line 60270 reads the machine code into memory and executes it. The large number at the end of the data statements is a checksum so the program can tell if the machine code section has been typed in correctly.

The routine should be called at the very beginning of your own program since it resets the top of memory and erases any variables you have stored. Once the routine has been called with GOSUB 60000 it's possible to return to the normal character set with POKE 53272,4, and you can switch back to double height characters with POKE 53272,8.

The subroutine at line 60300 is the most frequently used. To write text onto the screen the vertical position, counting down from the top of the screen, is placed in DN, the horizontal position in LE, and the message is displayed in ME$. A call to 60300 is then made: the example listing shows use of this routine.

When the double height characters are set up, the cursor is overwritten by a space so it no longer appears to flash. Two more subroutines deal with this. GOSUB 60400 re-enables the flashing cursor, while GOSUB 60410 replaces it with a space so that double height spaces appear correctly when programs are running.

Memory organisation

To create enough space for the double height characters certain areas of memory must be moved. This is done automatically within the machine code. Screen memory is moved up to decimal 32768, hex $8000, which means any programs which POKE directly to the screen must be altered.

The new characters are stored below Basic, starting at decimal 40960, hex $A000. To protect these changes, the top of memory is lowered to 32768, leaving about 8K less RAM available for Basic use.

The only way you can reverse these changes is by pressing RUN/STOP and RESTORE simultaneously: POKE 648,4 tells Basic the screen has been returned to its normal state. You can get the double height characters back by calling the subroutine at 60000 again.

The machine code is stored in the cassette buffer where it shouldn't conflict with other programs. It won't affect the use of tape for data files and the like, since it can be overwritten once it has been called. If you still need to change the location of the program it's just a matter of changing the number 828 in lines 60000 and 60270 to whatever start location you prefer.

Other techniques

As the area of memory the video chip looks at to find its screen information is changed by the programs, the locations you can store sprites and user-defined characters in are also altered. The sprite data pointers are moved up from their normal start location at 2040 to 33784, and a whole new area for storage of sprite data is created between 33792 and 40960, hex $8400 and $A000. This makes room for 112 possible sprite definitions.

User defined graphics are not entirely prevented by the new double height characters, since there are still 64 character spaces left where shifted reversed characters normally fit. These spaces lie between 42496 and 43008, hex $A600 and $A800. The whole of the alternative character set (lower case letters) is also available between 43008 and 45056, hex $A800 and $B000.

The only problem with user-defined graphics at these places is that they can only be set (with POKE) and not read (with PEEK) by Basic, as they lie underneath the Basic ROM. This doesn't affect the way they are displayed, because the video chip automatically disregards the Basic ROM when it is reading its character data. PCN

```
10 GOSUB 60000: REM SET UP DOUBLE HEIGHT
CHARACTERS
20 FOR I=1 TO 1000
30  LE=RND(TI)*40: REM SET HORIZONTAL
POSITION
40  DN=RND(TI)*20: REM SET VERTICAL
POSITION
50  ME$="HELLO 123456789": REM SET UP
MESSAGE
60  GOSUB 60300: REM DISPLAY MESSAGE ON
SCREEN
70 NEXT I
80 GOSUB 60400: REM RE-ENABLE CURSOR
90 ? "[CLEAR]":END
```

Example listing

These lines can be typed in to prove that the program is working. They print a message 1,000 times in double height characters at random positions on the screen.

Program listing

Typing in the program

The program should be typed in exactly as shown here apart from those lines contained within square brackets. The abbreviations within the brackets refer to control codes, which are difficult to read in conventional listings. For example, [RUS] means press the control and RUS ON keys — a reversed R should appear within the quote marks. Correspondingly [DOWN] produces a reversed Q. Don't type in the commas, and where it says 'RIGHT 40' you should type control-right 40 times.

Save the program before you run it, because two errors might cancel one another out.

```
59999 REM*** SET UP D. HEIGHT CHARS ***
60000 I=828
60010 READ A:B=B+A:IF A=256 THEN 60025
60020 POKE I,A:I=I+1:GOTO 60010
60025 READ C:IF B<>C THEN PRINT"[RVS]DAT
A ERROR[RVOFF]":END
60030 DATA169,128,133,56,133,52,169,127
60040 DATA 141,13,220,169,51,133,1,162
60050 DATA 0,169,0,133,98,133,100,169
60060 DATA 208,133,99,169,160,133,101,16
2
60070 DATA 15,160,0,177,98,145,100,136
60080 DATA 208,249,202,8,165,99,24,105
60090 DATA 1,133,99,56,233,48,133,101,
60100 DATA 40,16,230,162,0,169,208,133
60110 DATA 99,169,162,133,101,138,10,10
60120 DATA 10,133,98,133,100,165,99,105
60130 DATA 0,133,99,56,233,46,133,101
60140 DATA 160,0,177,98,141,246,3,152
60150 DATA 10,168,173,246,3,145,100,200
60160 DATA 145,100,136,152,74,168,200,19
2
60170 DATA 4,208,231,165,100,24,105,248
60180 DATA 133,100,165,101,105,1,133,101
60190 DATA 177,98,141,246,3,152,10,168
60200 DATA 173,246,3,145,100,200,145,100
60210 DATA 136,152,74,168,200,192,8,208
60220 DATA 231,232,224,64,208,159,169,55
60230 DATA 133,1,169,129,141,13,220,169
60240 DATA 5,141,0,221,169,8,141,24
60250 DATA 208,169,128,141,136,2,32,68
60260 DATA 229,96,0,256,22792
60270 SYS 828:RETURN
60299 REM *** WRITE TEXT TO SCREEN ***
60300 PRINT LEFT$("[HOME,DOWN27]",DN);
60310 PRINT LEFT$("[RIGHT40]",LE);
60320 FOR MS=1 TO LEN(ME$)
60330 AS=ASC(MID$(ME$,MS,1))
60340 PRINT CHR$(AS+128);"[DOWN,LEFT,RVS
]";CHR$(AS);"[RVOFF,UP]";
60350 NEXT MS:PRINT"[DOWN4]";
60360 RETURN
60399 REM *** SET UP BLOCK CURSOR  ***
60400 FOR I=42240 TO 42247:POKE I,255:NE
XT I:RETURN
60409 REM ***    DISABLE CURSOR    ***
60410 FOR I=42240 TO 42247:POKE I,0:NEXT
 I:RETURN
```

Genie supplement

Three commands — MERGE, CLOSE and KEY BLEEP — are introduced by Keith Hook for the Colour Genie.

No matter how many Basic commands a manufacturer builds into a computer, you can always find other operations you wish they'd incorporated. This was my experience with the Colour Genie.

For the money, the Colour Genie is a very good machine, but I wish its designers had included a keyboard bleep which would give an audible signal that a key had been pressed instead of having to keep looking up at the screen.

Secondly, the designers have gone to the trouble of programming the ROM to execute a renumber routine, but omitted to add a utility to allow the end user to merge one program onto another. This is essential if, like myself, you keep a library of commonly used subroutines.

The listing provides you with these commands. The program can reside in memory just as long as you are not using the FGR screen. If you need to use the FGR screen, you can relocate the program to high memory, but you will have to save memory on power-up.

To write the routine, I had first to get the computer to recognise when I was requesting a CLOSE or OPEN command. As the two commands are used only in the direct input state — not as part of a Basic program statement — this didn't pose any problem.

Program overview

The keyboard data control block (DCB) is located in RAM at address 4015Hex. Addresses 4016 & 4017H contain the address of the keyboard driver which, in turn, is located at 03E3H in ROM. The keyboard driver continuously scans the keyboard and converts the bit pattern of any key that is pressed into ASCII, and stores the result in the A register.

By re-vectoring the jump address at 4016H to the address of the new routine, the program listed on these pages can intercept the scanning cycle of the computer. The program then looks at the value held in the A register and acts accordingly.

- If the value of the byte in the A register is greater than zero, the routine issues an audible bleep to signal that a key has been pressed, and then jumps to the next section of code which checks for a value of 0DH (carriage return).
- If the A register contains a 'carriage return', it means that the user has requested the entry into memory of the data just typed.
- If the Return key has not been pressed, the program returns control to the computer and the scanning continues to look for further entries.
- When the value of the byte is 0DH, the program checks address 40A7H, which holds the address of the buffer area used for storing characters typed in from the keyboard. The HL register pair is then loaded with this address and decremented by 1 byte — the next instruction RST10 increments the HL registers before testing each character pointed to by the HL registers. RST10 skips over tabs and line feeds and on its return the HL registers are pointing to the first non-blank character. The program then loads this character into the A register and tests for a "/". If the character is not "/", it places a cairriage return instruction (0DH) back in the A register and returns to the main computer input phase.

When the character returned in the A register is equal to "/", the routine looks at the following byte for a "O" or a "C", which should follow the "/" if the user is requesting a merge.

The 'C' command causes the program to look for the end address of the Basic program. This information is held in address 40F9H and also includes the end of the simple variable list. The routine then decrements the value of the two bytes to allow for the 00 bytes that Basic puts at the end of a program to signal this fact — (EOP) the End Of Program pointer (see issues 27 & 32).

This new address is then saved in 40A4H, which is the Start Of Basic pointer — get the picture? The program then calls ROM routine 1B4DH which executes a NEW command. New programs can now be added without disturbing programs already in memory.

When the 'O' command is detected, the program gets the start of Basic address from 4056H, which was loaded at the beginning of the utility [line 13]. This address is re-loaded into 40A4H (start of Basic pointer), and the programs are now merged, and can be listed as a whole.

Using the program

To close off a program type: /C [RET]
To merge the programs type: /O [RET]

When you have closed off a program, you can use the computer as though there was no program in memory, *ie* you can CLOAD : CSAVE : EDIT and so on without spoiling the program in memory. You can also close off as many times as you like — within the capabilities of available memory — but you can only merge once. This is because the program merges right back to the start of Basic.

Before merging, each program that follows the one already in memory must have higher line numbers. You can do this

```
12                              ORG  4016H
13 4016   0C49                  DEFW START
14                              ORG  4056H
15 4056   0158                  DEFW 5801H
16                              ;
17                              ORG  4900H
18        KEYSCAN:              EQU  03E3H
19        STK:                  EQU  40EAH
20        ;
21        BASIC                 EQU  1A19H
22 4900   INIT:                 LD HL, 5803H
23 4903                         LD (40F9H),HL
24
25 4906                         LD SP,STK
26 4909                         JP 1A19H
27 490C   START:                CALL KSCAN
28
29 490F                         OR A
30 4910                         RET Z
31 4911                         PUSH AF
32
33 4912                         LD A,07H
34 4914                         OUT(0F8H),A
35 4916                         LD A,0FEH
36
37 4918                         OUT(0F9H),A
38 491A                         LD A,08H
39 491C                         OUT(0F8H),A
40 491E                         LD A,10H
41 4920                         OUT(0F9H),A
42 4922                         LD A,00H
43 4924                         OUT(0F8H),A
44 4926                         LD A,0F0H
45 4928                         OUT(0F9H),A
46 492A                         LD A,0CH
47 492C                         OUT(0F8H),A
48 492E                         LD A,03H
49 4930                         OUT(0F9H),A
50 4932                         LD A,0DH
51 4934                         OUT(0F8H),A
52 4936                         LD A,00H
53 4938                         OUT(0F9H),A
54 493A                         POP AF
55;
56 493B                         CP 0DH
57 493D                         RET NZ
```

by executing a renumber as this will not affect any closed program.

To test the program type in the following:

```
1 CLS
2 PRINT "THIS IS THE FIRST PROGRAM"
```

Now type: /C [RET]

If you now LIST, you should be faced with a blank screen. Now type:

```
3 PRINT "THIS IS THE SECOND PROGRAM"
4 END
```

Now type: /O [RET]

If you now list the program, you should find both programs merged as one on your Colour Genie.

To alter the pitch of the keyboard bleep, POKE a value between 0-255 into location &H4927.

To turn the bleep off, POKE 255 into &H4917.

You can use this method of calling useful subroutines by adding new commands at the bottom of the listing, starting after byte 4953H *eg* /K [RET] could be used for a routine that changes all PRINT statements to LPRINT commands.

The merge and close part of the program will also work on a TRS80 or a Genie 1 if the start of Basic is altered to 42E9H [line 15]. PCN

```
                        ;LOAD DEFINED BUFFER
                        ;WITH START OF BASIC

                        ;PROGRAM START
                        ;KEYBOARD DRIVER
                        ;PUT OUR STACK BEFORE PROG START.



                        ;LOAD FREE SPACE POINTER
                        ;WITH START OF BASIC +2

                        ;JP BACK TO BASIC
                        ;CALL KEYBOARD DRIVER TO
                        ;SEE IF ANY KEYS PRESSED

                        ;NO SO RETURN
                        ;ELSE SAVE VALUE OF KEY PRESSED
                        ;ON STACK
                        ;LD PSG WITH CHANNEL 7
                        ;SEND IT
                        ;AND ACTIVATE SOUND
                        ;ON CHANNEL B ONLY


                        ;PUT CHAN B UNDER
                        ;UNDER CONTROL OF
                        ;ENVELOPE GENERATOR


                        ;NOTE VALUE -HIGH PITCH

                        ;ADJUST ENVELOPE
                        ;GENERATOR
                        ;TO SHORT PERIOD

                        ;SET ENVELOPE SHAPE
                        ;TO 1 PERIOD ONLY


                        ;RESTORE VALUE OF KEY PRESSED

                        ;CARRIAGE RETURN ?
                        ;NO SO RETURN FOR MORE INPUT
58
59 493E                 ;
60 493F                 EXX                 ;SAVE REGISTERS
61 4940                 XOR A               ;CLEAR A REG TO ZERO
63 4943                 LD HL,(40A7H)       ;GET BUFFER POINTER TO HL REGS
64                      DEC HL              ;HL MUST BE BACK PEDDLED
65 4944                                     ;1 BYTE FOR RST 10 CALL
67 4945                 RST 10H             ;POINT HL AT FIRST ADDRESS
68 4946                 LD A,(HL)           ;AND PUT CHARACTER IN A
69                      CP "/"              ;IF ITS A / THEN THERE MUST
                                            ;BE A O or C TO FOLLOW
70 4948                 JR NZ,ENTER         ;NO / SO GO TAKE A JUMP
71 494A                 INC HL              ;ADD 1 TO ADDRESS
72 494B                 LD A,(HL)           ;AND SEE IF CHARACTER IS
73 494C                 CP "C"
74 494E                 JP Z,CLOSE          ;IF YES GO CLOSE OFF PROG
75 4951                 CP "O"
76 4953                 JP Z,OPEN           ;IF ITS 'O' GO MERGE
                                            ;THE PROGRAMS IN MEMORY
77
78      ;
79      ;
80      ;
81 4956 ENTER:          EXX                 ;REPLACE ORIGINAL REGISTERS
83 4957                 LD A,0DH            ;PUT A 'CR' INTO A REG
84 4959                 RET                 ;RETURN TO KEYBOARD DRIVER
85 495A CLOSE:          EXX                 ;SAVE REGS
86 495B                 LD HL,(40F9H)       ;MAKE HL REGS POINT TO
87                                          ;END OF BASIC AND.....
88                                          ;END OF SIMPLE VARIABLES
89 495E                 DEC HL
90 495F                 DEC HL              ;HL-2 = NEW PROG START
91 4960                 LD (40A4H),HL       ;SAVE IN BUFFER
92 4963                 CALL 1B4DH          ;DO A 'NEW'
93 4966                 JP BASIC            ; GET BACK TO BASIC
94                                          ; READY TO MERGE PROGS.
95                                          ;
96 4969 OPEN:           EXX
97 496A                 LD DE,(4056H)       ;GET START OF BASIC
98                                          ;OUT OF BUFFER STORAGE
99 496E                 LD (40A4H),DE       ;PUT INTO START OF BASIC
100                                         ;PROGRAM POINTER
101 4972                JP BASIC            ;PROGRAMS NOW MERGED !!!
102                     ;
103                     ;
104  ENTRY: INIT
105  END
Exec address 4900H
(c) PCN & K.Hook 1984.
```

Save time driving on the streets of London with this short program from David Lewis.

London by short cuts

The program presented here, *London*, prints out the shortest route between any two points in Greater London.

It is used in conjuction with the Geographers' Master Atlas of Greater London, which covers an area of more than 2,000 square miles bounded by Potters Bar, Grays, Coulsdon and Windsor.

The map references for the squares of origin and of destination are entered as an eight-digit code, *eg* 27K247J1 (Southgate to Heathrow Airport). Ignore page numbers, and if there is no index number after the letter in the map reference use zero.

You may also enter the description or address of origin and destination, which will then be printed out, or you may instead enter Return. London will print out the approximate distance in miles and kilometres between the two points. It will then print the map references for each square of the Atlas (including those for both points) through which you should pass when taking the shortest route.

It is then a relatively simple task to plan your car journey, using the Atlas. The effect is as if you had the pages of the Atlas pinned on the wall as a composite chart measuring some seven feet by eleven feet, for planning the straightest route with map pins and cotton.

If you have a cassette player in the car, it can sometimes save time over a long, unfamiliar journey to record the details of the route and play the tape as you go along.

PCN

Program notes

40-50 Switches control to the subroutine whose name has been assigned to the string variable 'Z'

70 Converts alphanumeric map reference to a number (allowing for non-use of 1 and 0 in Atlas)

90-120 For a series of diagonal 'steps' from origin to destination, calculate distance across (west-east) and down (north-south), *eg* one map square across and .75 map square down, converts resultant numbers to alphanumeric map references, and prints

140-260 Main program procedure

140 Input origin and destination addresses (on 24-column screen to facilitate formatting for microprinter)

150 Input both map references as eight (=4+4) characters

160-180 Converts origin and destination map references to numbers and assigns variables to them

190 Prints origin and destination addresses or place names (unless null strings were entered)

200 Calculates west-east and north-south distances in map squares between origin and destination, and anticipates 'negative' directions (south-north and east-west)

210-220 Uses Pythagoras' theorem to calculate true (diagonal) distance in length equivalent to map squares, converts to and prints miles and kilometres

230 Prints map reference of origin

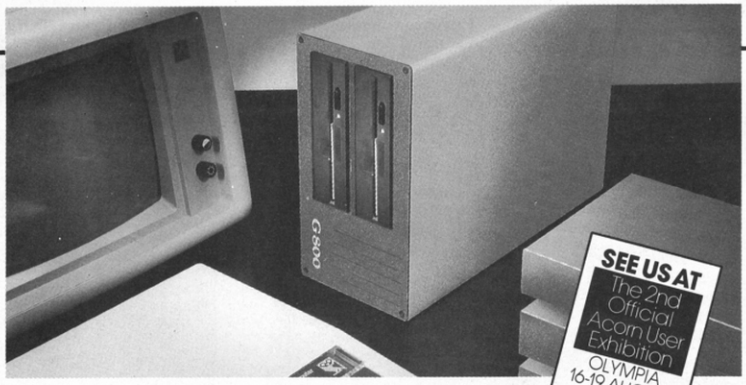
240 Divides west-east and north-south distances into units of distinct lengths, so that there are the same number of units in each dimension, assigns unity to length of greater unit and the appropriate fraction to that of the lesser unit

250 Negatives values of step units for SN and EW directions.

260 Uses 90-120 subroutine to calculate and print each diagonal step, and feeds paper

```
10 'COPYRIGHT (C) A.D. LEWIS 1983
20 GOTO140
30 '*SWITCH*
40 IFZ="ALPHANUM"GOTO70
50 IFZ="NUMERALPH"GOTO90
60 '*ALPHANUM*
70 ATLON$="ABCDEFGHJKLMNPQRSTUVWXYZ":LTR=INSTR(ATLON$,LTR$):NUM=LTR+24*INDEX:RET
URN
80 '*NUMERALPH*
90 FORK=1TOMORE:FLA!=FLA!+SLA!:LPRINTUSING"ÉÉ ";FLA!;:FLO!=FLO!+SLO!:NUM=FLO!
100 INDEX=(NUM-1)\24:NM24=NUM MOD24:LTR=NM24-24*(NM24=0)
110 IFINDEX=0THENINDEX$=""ELSEINDEX$=STR$(INDEX):INDEX$=MID$(INDEX$,2)
120 LTR$=MID$(ATLON$,LTR,1):LPRINTLTR$:INDEX$:NEXTK:RETURN
130 '*MAIN PROC*
140 TITLE"LONDON":WIDTH24,20:PRINT"Use MASTER ATLAS":PRINT"OF GREATER LONDON":PR
INT"From (address)":LINEINPUT"",FROM$:PRINT"To (address)":LINEINPUT"",TU$
150 DEFINTA-Y:DEFSTRZ:PRINT"29F240M2=EXAMPLE":PRINT"FROM  TO":INPUT"",R$:IFLEN(R
$)>8THEN150
160 FLA!=VAL(LEFT$(R$,2)):TLA=VAL(MID$(R$,5,2)):FLOL$=MID$(R$,3,1):TLOL$=MID$(R$
,7,1):FLOI=VAL(MID$(R$,4,1)):TLOI=VAL(RIGHT$(R$,1))
170 LTR$=FLOL$:INDEX=FLOI:Z="ALPHANUM":GOSUB40:FLO!=NUM
180 LTR$=TLOL$:INDEX=TLOI:Z="ALPHANUM":GOSUB40:TLO=NUM
190 LPRINT:IFFROM$+TU$>""THENLPRINT"From":LPRINTFROM$:LPRINT"to":LPRINTTU$:LPRIN
T
200 DLA=TLA-FLA!:DLO=TLO-FLO!:SDLA=SGN(DLA):SDLO=SGN(DLO):ADLA=ABS(DLA):ADLO=ABS
(DLO)
210 DIST2É=ADLA↑2+ADLO↑2:DIST!=SQR(DIST2É):DISTM=DIST!*.5329:DISTK=DIST!*.8576:I
FDISTM>1THENPLURAL$="s"
220 LPRINTDISTM;"mile"+PLURAL$,DISTK;"km"
230 LPRINT:MORE=1:Z="NUMERALPH":GOSUB40
240 MORE=ADLA:LESS=ADLO:SLA!=1:IFADLO>ADLA THENSWAPMORE,LESS:SLO!=1:SLA!=LESS/MO
RE ELSESLO!=LESS/MORE
250 SLA!=SLA!*SDLA:SLO!=SLO!*SDLO
260 Z="NUMERALPH":GOSUB40:FORJ=1TO4:LPRINT:NEXTJ:END
```

NOTE THAT THE SYMBOL ↑ IN LINE 210 CORRESPONDS TO ^ ON THE HX20'S KEYBOARD



The Graduate.
The first IBM PC compatible upgrade for the BBC model B micro.

From only £764.00 the new Torch Graduate will upgrade your BBC Model B to a powerful 16 bit business computer.

Disc and hardware compatible with the IBM PC, the Graduate is the latest addition to the Torch range of BBC upgrades. It's MS™-DOS operating system is customised to IBM compatibility allowing exploration of the massive range of IBM compatible business software, programming aids, compilers and languages universally available from most major software houses.

Introduction to MS™-DOS

The Graduate offers two levels of upgrade, the G400 and the G800, both with 128K on board user memory as standard (optionally 256K). This can be increased to 1.2 Mbytes with an IBM compatible expansion board. The G400, contains a single, double sided 320K formatted disc drive and provides the low cost introduction to MS™ -DOS for the user who wants real 16 bit power from his Model B.

TECHNICAL SPECIFICATION

- 8088 16-bit processor running at 5 Mhz
- 128K or 256K RAM
- MS™-DOS operating system customised to IBM compatibility
- Model G400 – Single, double sided, high density disc drive (320K formatted)
- Model G800 – Twin, double sided, high density disc drives (640K formatted)
- Integral stabilised power supply
- 2 IBM PC compatible hardware expansion buses
- Software compatibility allows Lotus 1-2-3 and all popular IBM PC business programs to run without modification, subject to the constraints of the BBC keyboard and display
- Disc interface is not required
  Keyboard text and graphics supplied by BBC Model B

• THE GRADUATE •

More data storage

A step up from the G400 is the G800 which offers twin, double sided 320K disc drives for extra data storage. Both the G400 and the G800 provide the possibility of further expansion for networking, modems, etc., via the IBM compatible hardware slots provided by the Graduate models. Each model comes complete with a well written user/technical manual and connecting leads.

Just plug it in

Unlike other add-ons there is no need to open the BBC to make the connection. The compact and tidy Graduate models simply plug in to the 1MgHz bus on the Model B. Within minutes you can be up and running with an IBM PC compatible system that really means business.

The range

Add 256K RAM, 640K disc storage and IBM PC compatibility to the BBC Micro for less than £1,000.

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PC N8

The Graduate is manufactured by Torch Computers under licence from Data Technologies Ltd.

Leave your home safely in the hands of the Radionics CNS, says Brendin Lewis.

RADIONICS Runs the Show

With the current proliferation of microcomputers in both homes and business alike, one aspect of computing is all but forgotten. This is control, *ie* the ability to control various devices around the home, business or wherever.

The Radionics CNS goes some way to fill this market, where other manufacturers offer only add-ons. Both sensing and control ports come as standard allowing control of devices ranging from robotic arms to the garden hose.

Add these facilities to a machine which is TRS-80 Model 1 compatible (plenty of freely available software) and we may be looking at an interesting product. Nor is expandability forgotten with printers, disk drives and RAM expansion available immediately.

Working from first impressions it seems that this machine is aimed at two main sectors of the market, these being the electronics dabbler and the education sector, where I feel the system could do well.

Construction

I must admit that when I first set eyes on the beast, that's exactly what I thought it was, a beast. It is certainly not the best looking machine on the market, but as the old saying goes, you can't judge a book by its cover.

When you take a closer look at the system its good points become apparent. It has a metal base which gives the machine a good measure of rigidity and also doubles as a heatsink. All connectors are mounted either on this metal base or directly on the pcb (printed circuit board), which in my view is not a good practice as the constant plugging and unplugging does put stress on the board. There are advantages in doing this though. The system is easier to assemble, and this and other reasons keep costs down thus giving the machine better value.

Nothing is marked on the casing to describe the various connectors and it is virtually impossible to guess what most of them do without referring to the manual. The manual starts with setting up the machine which helps a bit.

The keyboard has a total of 57 keys including four cursor keys and two function keys. The positioning of these keys seems a little strange at first but one gets used to it fairly quickly. In use the keys are excellent and typing is comfortable. By today's standards, 57 keys seems very few, but as with many things simplicity can be an advantage.

The unexpanded system uses cassette based file storage, the cable for which is an integral part of the machine. This is probably to prevent people plugging a normal lead into the control ports, as these use standard 3.5mm jack sockets. Though clamped to the machine, the lead is easily removed when a disk expansion is fitted.

The system on its own uses only 5 volts to control external devices. If mains voltages need to be switched Radionics supplies the


SPAGHETTI
TOMATOES
SPUDS
GILL
677 0
6812
WELCOME
TURBINE

◀25 Mains Switching Unit which gives control of devices up to 1500 watts (approx 6 amps) rating. This is a standard, dual mains outlet which contains a transformer and a relay for each outlet. These relays are energised by the control signals from the computer via the jack leads.

The unit works well except when first powered up: in fact, when I powered the unit up the computer reset itself, as did the TV set.

This is caused by powering up the small transformer without a load applied.

Documentation

Two manuals are included with the system — a user guide and a project manual. Both are of high quality in print, paper and presentation.

The user manual contains a section explaining the machine's Basic, which seems accurate and is clearly presented. The section on control and sensing has lines through it and tells you to refer to the project manual for details. If this information is of no use, what is it doing in the manual?

The final section of the manual contains the circuit diagrams and an overlay of the pcb, or at least it should. What it does contain is an overlay of a different revision pcb, and circuit diagrams of the control, sensing and printer interfaces are missing.

The project manual on the other hand contains descriptions of how to use the six control ports and the four sensing ports. This includes the addresses which are used to switch devices on or off. A short section also deals with using the sound facility through the internal speaker.

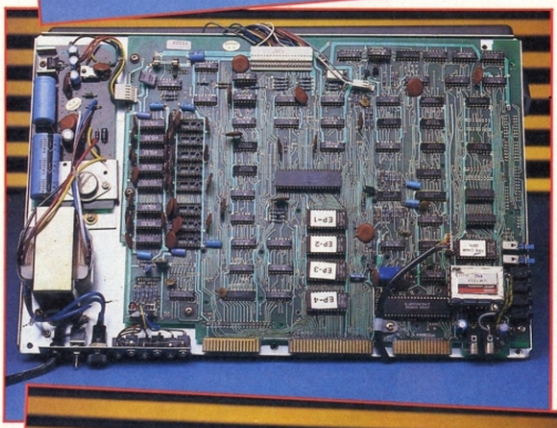
Following this, eight separate projects are described in detail with instructions on how to construct the various bits of hardware and lists the software required to run on the system for each project. The projects include a favourite TV programme finder, a garden hose monitor, a smoke alarm, a house plant waterer, home security lights, wind and moisture indicators, a burglar alarm and a disco light controller.

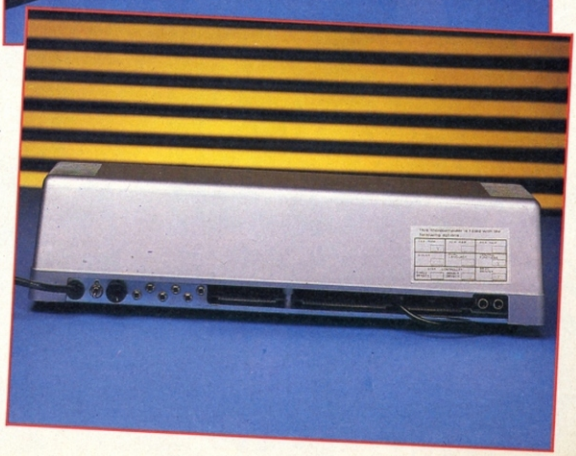
Most of these projects are made up of household bits and pieces with the addition of freely available electronic components like solenoids and LEDs. For this reason all projects could be tackled with confidence by any novice.

Owners of the CNS are eligible to receive the CNS Club Newsletter which promises to bring news of projects from both the Radionics workshop and from other CNS owners. This is an appealing idea and makes for good owner/manufacturer relations.

Expansion

Even though the CNS is designed for users to build their own interfaces, the system does have a few of its own. It is possible to expand the 16K RAM up to 48K; 16K plugs directly into the pcb while the other 16K is fitted to a 'piggy back' board which fits above the board mounted memory. A disk controller board can be internally mounted to the roof of the case, with the option of a double density controller that plugs directly into the single density controller.





Printers can also be fitted, with a Centronics type interface already built into the system, though it seems that this printer will only operate from within Basic. Another interface is required when using the system with the DOS because the printer controller is the same as that used for the control and sensing ports and would therefore be configured at the wrong I/O port for the DOS.

Expansion of the control and sensing section of the machine is also possible with the number of control ports increasing from the standard six up to a total of 255. The control ports are expanded externally, whereas the sensing ports can be expanded from four to 22 internally.

In use

When powered up the screen displays random characters because the system does not do a power-on reset. I find this incredible as the circuit to do this is so simple that it should be fitted to every machine as a matter of course. On this system the reset button (again unmarked) needs to be pressed before the screen displays 'Komtek micro system', and not Radionics as the manual states. Komtek is also marked on the printed circuit board, so who is Komtek?

The Basic used on the system is standard Microsoft level 2. Due to this and other small details the CNS is compatible with the TRS-80 Model 1 and the Video Genie models 1 and 2.

No software other than the resident Basic was available with the review machine, so I contented myself with tapping in some of the Basic programs from the manual. There should be no problems obtaining software for two reasons; the first is the machine's TRS-80 compatibility and the second stems from the version of Basic used. Being Microsoft Basic it makes the system semi-compatible with a whole range of other machines, from which software conversion should require a minimum of effort.

One thing I learned by typing in the programs was that the sound facility didn't work, from within Basic at least. The other thing I found was just how easy it is to control an external device with this machine. One memory location in the system is mapped to the control ports. Within this one byte the six least significant bits are used, one for each of the ports. When the relevant bit is set to 1 then that port is switched on, if set to a 0 it is switched off.

The best way to describe the use of the control and sensing facilities is to give an example, so the following section briefly outlines two of the manual's projects.

The smoke alarm hardware is of a simple design. Using a plastic tube with a hole drilled in the middle of it, one end is fitted with an LED and the other with an LDR (light dependent resistor). Under normal conditions (*ie* smokeless) the LED would light the LDR and a constant, known output is present. When smoke enters the light chamber the light reaching the LDR is reduced and thus the output changes. This output change is sensed by the computer and the action taken is to switch a control port on. This port would be connected to some form of alarm. This project is controlled by a program contained on one side of A4 paper.

Another interesting, and again very simple, project is called home security lighting. This type of device is already used in many homes to prevent burglary. All it does is switch lights on and off occasionally to give the impression that someone is at home. This project uses the Radionics mains switching unit to switch the mains voltages.

Two methods of control could be used for this project. The simplest method would simply switch the lights on and off randomly by interrogating a random number generator; the problem with this system is that the lights turn on and off erratically, which is unnatural. The other, more efficient system uses the inbuilt real time clock to switch the lights in a given order and at a given time. Thus, this system could simulate a person going to the kitchen and then back to the lounge by switching on a kitchen light, leaving it for a time and then switching it off.

Due to time constraints it was impossible to test any of the projects from the project manual. I did, however, make up a little test of my own based on one of the published projects (the TV timer). Being a keen cricket fan, I wanted to keep in touch with the score from the television. So I wrote a small Basic program to set the clock and then switch the TV on for five minutes every half hour during the afternoon. This was very successful.

It's all very well to talk about computer control, but without some sort of feedback from the device being controlled, the control is almost useless. For example, my TV switch on/off would be of no use if no power was applied to the mains switching unit as the computer would still think it had switched on the TV. This is where the sensing ports come into their own because these actually produce the much needed feedback.

The sensing ports work on a very simple principle of short/open circuit, *ie* if the two sense wires are shorted together then one bit within the system is changed and can be acted upon. This bit is tested in much the same way as the control ports. One byte in memory is set aside as the address of the sensing ports. By looking (PEEKing) at this address it is possible to find which port or ports are active. The four high order bits in the byte are mapped to the four sense ports and are normally at logic 1, but if a port is activated then its value changes to a 0.

The system of control and sensing mentioned above is fine, provided that you don't really want to control various devices throughout a house. Problems arise when separate cables for both control and sensing need to be run to each location. This process will prove untidy unless they are installed when the house is built or rewired.

There is another method of controlling devices around the house which, as far as I know, is not available for the CNS. This system uses the existing mains wiring to communicate with the devices by modulating data signals onto the 50Hz mains signal. This type of system is known as a broadcast system because all devices connected to the mains would receive the data. Therefore, all devices need a separate identification number so they only respond to commands meant for them. This type of system is more expensive than the simple relay type switching because electronic decoders need to be fitted to the mains sockets.

Certain precautions must be taken with this type of system because of the hazards of using mains voltage. All of the encoding and decoding electronics must be suitably isolated from the mains supply and a filter must be placed at the mains inlet to the house to prevent the modulated data signals from escaping to other houses. Otherwise they could cause interference on radios and TVs. Also, if a neighbour uses a system similar to yours, some of his devices may be activated by your signals.

Verdict

Though not the best presented system available, the fact that the control and sensing ports are fitted as standard and are so easy to use makes the machine an ideal educational tool. Not only in schools and colleges, but also for anyone interested in learning about some of the principles of computer control.

TRS-80 compatibility gives the machine a large, already established software base. It also offers an easy upgrade path from the basic cassette filing system to the full double density disk system. Taken together, this and the range of services provided by Radionics result in an interesting product which is reasonably good value. PCN

SPECIFICATIONS

Price	£250
Processor	Z80 2MHz
Rom	16K Basic
Ram	16K expandable to 48K
Screen	64 × 16 or 32 × 16
Keyboard	57 keys, 2 function keys, cursor keys
Interfaces	Disk, Mains switching unit, plus various DIY
Operating system	None
Software included	None
Distributor	Radionic Systems, 3 Woodland Way, Bristol

SPEAKING SIMPLY

Your micro can answer you back. Nickie Robinson investigates with her Oric.

The power of verbal communication is available to your computer with this versatile speech box. It works on an allophone (units of sound) system, rather than a digital system, with a total of 63 allophones available.

Design

The module is a small, unassuming grey box, which is compact and light. The short connecting lead comes in a polythene bag and is bought separately since it is machine-specific.

Documentation

The documentation is brief and comprises an eight-page manual, which comes with the unit, and a sheet which accompanies the connecting lead.

The manual contains little useful information besides a table of the 63 allophones, used to construct your words, and a list of sample words you can plug in when you find yours aren't too successful. It is, however, emphasised that the manual is meant only as a guide and that the detailed documentation for each machine is provided with its connecting lead. This detailed documentation turned out to be one side of a flimsy piece of A4 paper, which did, however, give clear instructions on how to set up.

There are only two short sample programs demonstrating how to build up words. The sheet accompanying the Oric 1 lead is also meant for the Atmos and the instructions are a little ambiguous as to which calls you should use for each machine.

Maybe the brevity of both guide and manual is an indication of how easy it is to use the Speakeasy unit, and in fact it can be set up and put into use with considerable speed and ease.

Setting up

I connected the voice box to an Oric 1 via the printer lead and a flying lead which is firmly pushed into pin 33 of the expansion port. You know if you have got the right pin as there is a loud buzzing noise reminiscent of a cow box when you switch on.

In use

Not surprisingly, as the connection is via the printer port, allophones are produced using the LPRINT command with a sequence of CHR$s. LPRINT must be preceded by a CALL to turn off the keyboard scan and another CALL to turn it back on when the output is completed.

Using one of the sample programs this rather egotistical baby's first words were not 'Da-Da' but 'I' and then 'I am'. Putting Descartes before the horse it was then programmed to say 'I am, therefore I think'. By this stage the voice did sound rather jumbled and, if the truth be known, you could only really understand it if you knew what it was supposed to be saying anyway, and even then you needed a bit of imagination.

Obviously it is a time-consuming venture getting sound-perfect words. But it is good fun trying and the sample words prove it is possible.

Quite often you find the sounds you want are not in the list of 63 allophones and you must make do with something similar. Sentences are created by stringing together the required allophones (you'd be surprised at the number of sounds that go into one little word). Having laboriously thought a sentence through, it was disappointing to find that when run it bore little resemblance to any form of English. But with a little practice . . .

A little more information on the various processes of speech is called for, if only for interest's sake. Voiceless fricatives — the blowing of air through a narrow space without vibrating the vocal cords (as if you didn't know already) are mentioned in the manual. They are FF,TH and SS (as in shirt). You are also told you need pauses before BB, DD, GG and JH. This produces the blocking of air flow and then sudden release involved when using these allophones. There are four different pause lengths from ten to 200 milliseconds, the latter being used between clauses and sentences.

Verdict

The unit costs £29.95 and the lead a further £4.50, so it is a fairly average price. The voice could have been improved by a variable tone. As it stands it is very robot-like. Also, a little information on the use of memory and how to drive the module from machine code would have helped programmers wishing to produce compatible software.

It is, however, enjoyable trying to put your sentences together and, as the manual says, the machine could be put to useful purposes. It could also be very effective in adventure games. PCN

Product Speakeasy **Manufacturer** Jamar. Tel: 0924 495923 **Price** £29.95 for main unit, £4.50 for cable **Outlets** Spectrum UK stores and other computer shops.

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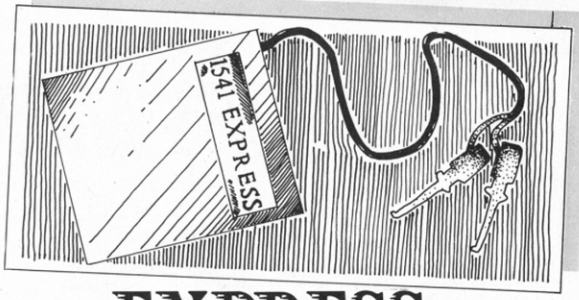

EXPRESS POINTS

This cheap and easy to use add-on speeds up the 1541 Commodore disk drive. Barry Miles gave it a whirl.

The slow speed of the 1541 Commodore disk drive has been an irritation to the users of the Vic and Commodore 64 ever since it came out. But now this has been remedied by a nifty device called the Express Cartridge produced by Ram Electronics.

As its name suggests, the essence of the Express Cartridge is that it doubles the speed at which the data is transferred to and from the disk drive. It comes in the form of a cartridge with two wires protruding from it. After slotting the cartridge in, these must be attached to some pins inside the machine.

Installation

Setting the system up is not simple, expecially if you are of a ham-fisted disposition. The 64 must be taken apart and the 6510 and the chip in the V14 socket located. The two hooks on the ends of the wires are then clipped onto pin 28 and pin 15 respectively. After reassembling the machine, you are ready to go.

The technique is not difficult, but it may deter someone who is not used to handling electronic components. The clip-on approach as opposed to soldering, however, has the advantage that the machine can be returned to its original state with just a few scratches on the screws.

All that now remains to do is simply to insert the cartridge into the slot. Some care is necessary as the attached wires are rather short and can easily be pulled free of the pins. If this happens, the 64 must be taken apart and the wires reconnected.

People using motherboards may find installation a little easier because, when the cartridge stands upright, it places less tension on the wires, Ram Electronics tells me that the wires are longer on current models.

In use

On power up, the ability to work at a much higher speed is immediately available. The Express can be toggled on and off using the F1 and F3 function keys. F1 is on, F3 is off. An additional feature of the system is that RUN/STOP now produces a LOAD and RUN from the disk instead of the cassette.

This facility, which also exists on the SX 64, is a big advantage for the loading of Basic programs. However, if your program is in machine code and needs to be relocated to run, you will find that you have to go through the normal ritual of LOAD "program name", 8,1 in order to get the machine code relocated.

When loading, the Express gives a speed advantage of about three times over other normal systems and, considering the normal speed of the 1541 disk drive, this is quite an improvement.

The Express is completely transparent to most software except for some programs that will not work since they use the bus in an unusual way. In this case, the software needs to be loaded in slow mode. The other problem that may occur is that not more than one device may be connected to the 64 when using 'fast' mode. This does not apply when using two disk drives, and in this case adjustments need to be made to the Express to get things going. This involves turning one of the disk drives off, allowing fast mode to be used with the other. If two drives need to be used at once, the cartridge becomes redundant and only slow mode can be used. This will probably not be a problem for most people as a lot of 64 software is written with only one drive in mind.

The one remaining question is, how is it done? Ram Electronics is extremely reticent about this and all a reviewer can do is to guess. There are a number of ways that it could be done: one is increasing the read and clock speed of the DOS; another is to use two data lines instead of one. There is bound to be a fairly simple solution since things that work well are generally easy to do — but Ram is not about to let on.

Verdict

This is a very convenient piece of equipment calling on the user to make the bare minimum of alterations to achieve a significant speed increase. It is a far cheaper alternative than buying a faster disk drive and the appropriate interface to run it, and it should therefore appeal to many users.

One possibility well worth considering is cutting the wires and inserting a connector so that the Express can be attached and re-attached conveniently. In fact, the wires are only necessary when certain types of zero page operations are carried out by a program.

Ram Electronics had this type of connection fitted to the samples demonstrated at the Commodore User Show, and it would have been nice to see it on a production version. Aside from this, it is a very worthwhile piece of equipment.

PCN

Product Express Cartridge **Price** £49.95
Manufacturer Ram Electronics (Fleet) Ltd, 106 Fleet Road, Fleet, Hampshire GU13 8PA. Tel 02514 5858 **Outlets** Mail order from the above.

SOFTWARE

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Games

Beau Jolly's valuepacks take the limelight this week. They offer six games for the Commodore 64, Vic 20 or Spectrum 48K with a price tag of £19.99. The Spectrum 16K pack, with four games, is £14.99. This works out at well under £4 a game, a considerable reduction on normal prices. Most of the games are from Imagine and include many old faithfuls. Further valuepacks are planned — including one for the BBC before Christmas.

Beau Jolly has also released a new Imagine game, *BC Bill*, available for the BBC, Commodore 64, Dragon and Spectrum. It's another on the caveman theme: you gather up as many wives as you can and keep your offspring adequately fed until they're old enough to leave the cave to fend for themselves. It goes without saying that you're under constant attack from predatory dinosaurs. We'll review the game in full soon.

Though *PCN* introduced *Flight 401?* (Oric/Atmos) as recently as issue 71, Knight Software has already rereleased the instrument-only flight simulator. Changes include faster screen update and more accurate instrumentation.

Penguin Software's *Stellar 7* comes on disk with the Commodore 64 version on one side, the Apple on the other. It's a tank game, along the lines of *Battle Zone* or *3D Tank Zone* on the BBC. You command the tank Raven, whose instrumentation includes a radar (Gravatic Scope), Protonic Shield and fuel levels. Alien craft are shown as wire figures, but the 3D perspective manipulation is excellent.

Also excellent is *Potty Pigeon* for the Commodore 64. The quality of software for this machine is rising rapidly. Your task, as the eponymous pigeon, is to build a nest from twigs on the road. You swoop down, dodging cars and avoiding birds of prey which force you to drop your burden. Points can be scored by bombing the cars — only modesty prevents us from saying how. The smooth scrolling background is the best we've seen for a long time and even the 3D parallax is correct. Also emerging from Gremlin Graphics is *Monty Mole* on both Commodore 64 and Spectrum. On the model of *Manic Miner*, you play the part of Monty Mole, who collects scraps of loose coal scattered through the mine. It's far from easy, but life is made simpler collecting boxes of worms. Like *Potty Pigeon*, this one has exceptionally good graphics.

Merlin, the greatest wizard of all time, is once again the victim of a conspiracy by the forces of evil. In this Commodore 64 battle of good and evil, destroy the hordes by casting spells. Hazards include spiders, Hell-wasps, parachutes and witches astride broomsticks. As your five lives run out you replenish your energy by collecting unsavory ingredients for your life-giving magic brew. The graphics are a bit limited, but it's all good fun.

As games prices continue to fluctuate, Comsoft has dropped its BBC games to £4.95. One of its new releases, *Custard Pie Fight*, wins our coveted Title of the Week award. This one or two player game is set in a kitchen where two chefs battle it out between fridge and cooker.

Utilities

Penguin Software continues to churn out graphics packages for the Apple: *Cat Graphics* adds 55 new commands to Applesoft Basic and is compatible with the II, II+, and the high-resolution graphics of the IIe and IIc. It offers 108 colours, 256 in double resolution mode. Images can be scrolled horizontally and vertically as well as 'packed', and parts of pictures moved. The package also offers sound and text-font handling.

DAP1 and 2 are data analysis and curve fitting programs for the BBC, which allow graphs and functions to be produced and dumped to a printer. There are facilities for interfacing the programs to your own programs. *Mach 1*, a machine code utility featuring a combined assembler/disassembler, is compatible with Acorn's second processor and comes on disk or as a 16K EPROM.

Educational

Graph Easy covers the graphs and equations parts of the GCE 'O' and 'A' level syllabi, but can also be used as an applications program for data analysis. The large manual gives many examples and the program makes full use of the Beeb's function keys.

PCN

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Xyphus	$34.95	Penguin 312 232 1984 (Geneva)
Stellar 7	$29.95	Penguin 312 232 1984 (Geneva)
Cat Graphics	$34.95	Penguin 312 232 1984 (Geneva)

BBC

Wallaby	£7.95	Superior Software 0532 459453
Smash and Grab	£7.95	Superior Software 0532 459453
DAP1	£15.00	Gnomonica 0306 712317
DAP2	£20.00	Gnomonica 0306 712317
Mach 1	£39.94	Gnomonica 0306 712317
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COMMODORE 64

Potty Pigeon	£7.95	Gremlin Graphics 0742 753423
Monty Mole	£7.95	Gremlin Graphics 0742 753423
Merlin	£6.90	Wye Valley Software 05446 202
Stellar 7	$29.95	Penguin Software
BC Bill	£5.50	Imagine (Beau Jolly) 01 567 9710
Valuepack	£19.99	Imagine (Beau Jolly) 01 567 9710

DRAGON

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Serpent's Lair	£4.95	Comsoft 0532 665621
Custard Pie Fight	£4.95	Comsoft 0532 665621
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ORIC/ATMOS

Flight 401?	£6.95	Knight Software 0282 842992

SPECTRUM

Monty Mole	£6.95	Gremlin Graphics 0742 753423
Jump	£5.99	Unique 0753 655533
Red-Attack	£5.99	Unique 0753 655533
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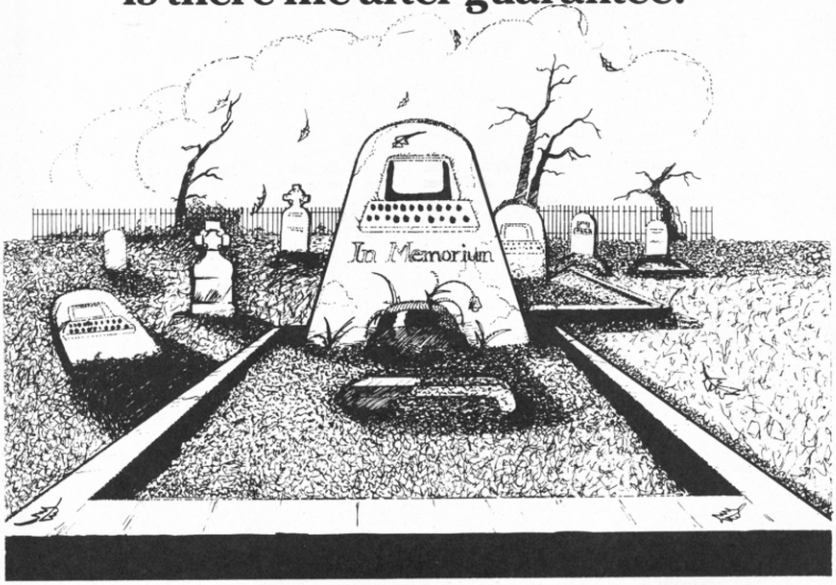

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PCN PRO-TEST SOFTWARE

ALL-IN APPLE

An affordable intergrated package is dissected by Neville Ash.

Integrated PC packages are the most exciting software development of 1984 (see *PCN* issue 72). For many users, however, the price tag of £400 plus puts them out of reach.

Apple users, however, have access to *Incredible Jack* at £355 and *Appleworks* at £175. Moving even further down the price range, Practicorp is now offering *Practicalc II* for only £69.95, but how does this low-cost integrated package stack up in practice?

Features

The first Practicalc, a Commodore 64 spreadsheet, is at the heart of Practicalc II. This is the method used by Lotus in its much vaunted *Symphony*, and one which can be made to work well. The sheet can be used to generate models of financial or other numeric details, and formulae dependent on data or other formulae can be entered in the cells of the matrix for fast calculations. This is handy for a range of applications including household accounts and professional financial forecasting.

In word processing mode, text can be entered and data from the spreadsheet can be imported, as can information from the database facility.

In use

The first move is to set up the program for 40 or 80 column mode, and Practicalc II supports most of the 80 column Apple cards around.

The program disk and manual come in a box, and as we were using a beta-test version there was also a large addendum which gave details of the word processing and database extensions to the original Practicalc system. The final version of the manual will be a single entity, but the basic 75-page manual is clearly written with plenty of examples, so there is every reason to think that the same qualities will be found in the revised version.

Once the program is loaded you'll see the standard spreadsheet outline on the screen: rows A to T and columns zero to three. The maximum dimensions are 254 rows by 100 columns and the amount of free RAM for data storage is shown at the top left of the screen — 32K at first, decreasing as you enter values, variables or formulae.

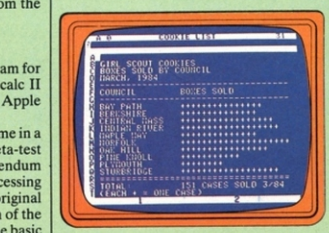
Information entered is first displayed on the data line above the spreadsheet outline and instructions are prefixed by a backslash, as with other well-known spreadsheets. The four arrow keys are used to move the cursor around the matrix, but owners of older Apples will have to resort to Control-Q and Control-Z for up and down.

You always start with the spreadsheet. Pressing backslash and O will take you to the main options menu from which you can choose to use the basic spreadsheet outline for word processing, database or spreadsheet functions.

The spreadsheet provides a wide range of features, including 30 mathematical operations from square roots to trigonometric functions. A neat feature not always found in spreadsheets is that once entered, labels and formulae can be edited, rather than having to be retyped. And, of course, full standard spreadsheet operations such as 'replicate' are provided. Unlike some packages it's possible to adjust individual column widths to accommodate longer labels or bigger figures, and even the formatting of the cells can be set locally or globally.

While the package can handle a fairly large number of cells, up to 2000, it's also possible to consolidate two small spreadsheets for such manipulations as totalling. And if this list seems impressive for a package costing under £100, there's also the facility for 'hiding' columns, so you could hide columns 4 to 95, allowing you to compare columns 3 and 96 on-screen, very useful.

As a spreadsheet, Practicalc II works pretty well, even if it does use the rather old-fashioned method of cell reference, A5



+ C9 = E2, for example, rather than Multiplan's winning approach of formulae such as Wages + Costs = Overheads. But then Multiplan retails at over twice the price of Practicalc II and even lacks some of the cheaper package's features.

For word processing you must select the 'long label' option from the main menu. Entering 99 to the Auto Enter prompt provides word wrap. Now, when you return to the spreadsheet outline, your lines of text appear on the dataline and, as they're completed, are moved into the sheet, with the number of characters entered shown at the top right hand corner. Each line of text can be up to 100 characters long and paragraphs can be justified and text arranged in columns.

Practicalc II can be used as a database, and with its facilities for sorting and searching numerically or alphabetically, it can be used as a fairly efficient, if rather simple filing system. The use of conditional 'formulae' (IF . . . THEN) further extends its possible applications and there's even a simple character bar graph feature within the spreadsheet, as well as the facility for having formulae printed out.

Integration between the various parts of the package is achieved by saving whole or partial sheets before loading them into other options from the main menu. This makes it easy to produce spreadsheet calculations, results of database searches and so forth for pasting into documents, or inserting text into a spreadsheet. There are also facilities for formatting disks and viewing directories from within the program.

Verdict

The package betrays its spreadsheet roots, and the word processing and database features are nowhere near as powerful, relatively speaking, as the spreadsheet itself, giving the impression of being 'tacked-on'. But the features of an integrated package for under £100 can't be sneezed at. Given its retail price, Practicalc II is remarkable value for money and now that Practicorp has announced similar, low-cost PC software, PC users will soon be able to experience the delights of low-budget, but competent, software.

PCN

RATING (/5)

Features	4
Documentation	3
Performance	3
Usability	4
Overall value	4

Name Practicalc II **Application** Business **Price** £69.95 **System** Apple II series (IIc available in September) **Publisher** Practicorp 0473 462721 **Format** Disk **Other versions** None **Outlets** Dealers.

ELECTRIFYING GRAPHICS

The blinding speed and versatility of games developer White Lightning impressed David Janda.

This high-quality graphics development system offers Spectrum games designers the flexibility missing in menu-driven utilities, or packages where separate routines perform a particular operation only, leaving the programmer to thread them together with the crude Basic control constructs available.

Oasis software has approached the problem of games design in a completely different way. Over a period of time it has produced an integrated high-level graphics development system to make others in the field redundant.

This has been achieved by providing the programmer with a flexible tool — Forth. Add to the standard definitions a sprite/graphics extension called Ideal, throw in a separate sprite generator and you have the White Lightning graphics development system.

Features

Most of the features are described in the boxes opposite, but here is a general overview.

At the system's core is a full implementation of Fig-Forth. As well as the standard words there are Basic/Forth words and the Ideal subset. Programs can be written in Spectra Forth (as Oasis calls it) or space can be reserved for the inclusion of Sinclair Basic. Using this feature it is possible to write Forth programs that call Basic as a subroutine or vice versa.

When a program is finished and debugged it can be compiled and the resultant source code will be ready to run. The source can also incorporate Basic. This means the string handling and floating-point bits don't have to be written in Forth.

The system works quite happily with the Kempston Joystick and Oasis claims it should work with many types of interface, though not Interface 1.

Very large programs can be compiled in stages. This is done by loading source code into one or two screens and compiling it a bit at a time.

In use

The package is definitely not of the load-and-go variety. It took me three days, on and off, to get to grips with the 131-page manual, let alone fiddle about with the language.

The sprite designer was the first part of the WL system I tackled. The 167 characters provided offer characters from many of the popular games and can be edited and changed easily.

Creating a sprite was simple enough at first, provided fancy features were kept for a later date. Using the various features of the package was quite easy. Careful thought has gone into the use of the keyboard with the cursor controlled by keys five to seven, and colour attributes accessed by using the keys with their associated keywords.

Completed sprites can be saved to tape for loading into the main part of the package.

Once Spectra Forth is loaded and running it provides a typical Forth environment with the OK prompt and the flashing cursor.

Entering VLIST, however, reveals the Basic/Forth words and the many words that make up the Ideal extension.

Bashing in Forth source code is not the easiest thing to do as many Forths have only a primitive editor. WL incorporates this editor for compatibility but the EDIT

command allows you to edit a line (à la Spectrum). It also lists the current screen and does a FLUSH — neat.

The wealth of graphics words available are surprisingly easy to remember because they end with a letter corresponding to a particular type of operation. M for memory, S for screen/sprite and so on.

The question with a package such as this is its speed. If the demonstration tape doesn't convince you, nothing will. It should be noted that speed also depends on how efficient the source code is in the first place, and for those who require machine code to be incorporated, it can be called from Forth.

Verdict

White Lightning is the best package I have used on the Spectrum. Its features and flexibility are second to none and have to be seen to be believed.

That it can be used as a Basic extension means the less experienced will be able to have a go without fear of getting bogged down, which is why I give it the thumbs up. And at £14.95 it represents tremendous value for money. PCN

RATING (/5)

Features	
Documentation	
Performance	
Usability	
Reliability	
Overall value	

Name White Lightning **Application** Games Development System **Price** £14.95 **System** Spectrum 48K **Publisher** Oasis Software, Weston-super-Mare (0934) 419921 **Format** Cassette **Outlets** Retail/Mail order.

Hybrid programming and the Basic Interface

WL allows the programmer to use Basic, Forth or a combination of the two. This gives greater flexibility in programming as some applications are best suited to a particular language.

There are three types of language interfacing, each designed for a particular purpose.

Within the Ideal extension there are 18 Forth/Basic words, such as DRAW, CIRCLE and so on. These words are treated as Forth words, and must be used as such. All arguments and parameters are taken from or put on the stack, and in operation they are faster than the Basic equivalent because all floating point interpretation is avoided when the word is being executed.

The second method of hybrid programming is to use lines of Basic as subroutines, *ie* call them from Forth. To do this, space for the Basic source is first set aside using the Ideal word RESERVE. This is followed by a number representing the amount of space to be reserved in bytes.

Basic is called from Forth by placing the line number on the stack and using GOTO. Control can then be returned to Forth with PRINT USR 3006, which then executes the very next word — *not* the next colon definition.

Forth can be called as a subroutine. Here, a RANDOMIZE 3000 is used to enter Forth and a return is made by using the Ideal word RETUSR.

To select the word to be called, a variable can be defined from Forth and its address found.

Once done, the variable can be poked from Basic and, on calling Forth, a CASE or IF can be used to select the appropriate word, CASE 2 OF "SECOND WORD", for instance.

The Sprite Generator

The two major stages in designing a game with WL are writing the game itself and defining the sprites it uses. For the latter, a sprite generator program is included with the WL package, but used separately.

The package allows you to define and edit sprites of various sizes and colours, which can be saved to tape for re-editing at a later date, or loaded into WL.

Oasis has provided 167 predefined sprites which cover popular games such as *Pac-Man, Space Invaders, Defender* and so on, as well as sprites used in the demonstration program.

The editor is made up of a 15 by 15 sprite screen and a smaller eight by eight CHR$ SQR, which is used to edit and create the sprite while the sprite screen is used to manipulate and transform sprites. Also provided on screen is information relating to attributes, logical operations and sprite information, including size and so on.

Data for sprites can be entered in two ways. First the CHR$ SQR can be used to fill in pixels, and secondly data can be entered as Hex.

Once done, it can be 'moved' to the sprite window where it can then be manipulated.

Sprites can be made up of several characters, and sprites can be placed within sprites. All the usual attributes can be set to the sprite as whole or individual characters. It is also possible to set Boolean operations on sprites (AND, OR, XOR) which produce interesting effects.

Up to 255 sprites can be defined, and if more are needed there's a merging procedure.

The Ideal extension

Fig-Forth is the host language of the White Lightning package, but the graphics end of things is the Ideal extension. Ideal (Interrupt Driven Extendable Animation Language) consists of 110 sprite/screen data manipulation words. These words perform operations on particular areas of the screen and sprites. There are words for screen, sprites, screen/sprites, screen/sprite windows, sprite/sprite windows and sprite/sprite operations.

A total of 27 variables are provided in Ideal, and these store data relating to windows, position of sprites and so on.

Many Ideal words are similar, allowing pixel/sprite data to be scrolled in four directions by a certain number of pixels. A number of GET and PUT commands allow sprites to be displayed with different effects on the data already there. Other graphics commands for colour and drawing are provided by the Basic/Forth words which are part of Ideal.

Sprites and screen may be inverted and reflected, and sprites can be spun and enlarged. Automatic sprites are not catered for, but a routine is provided in the manual to achieve the same thing.

One of the main features of the White Lightning package is the ability to perform background processing *ie* multitasking. This feature is crucial in games where a landscape needs to be scrolled, for example.

A background task may be performed up to 50 times a second. Though the background task continues until the task is finished, careful programming allows the programmer to do several jobs giving the impression that more than one task is happening at once.

Conflict can occur between Ideal variables when a background task is in operation, so it is possible to disable the interrupts. This allows a task to get on with the job in hand without being interrupted.

BBC B

Fun with Fat Man

Name Hi Bouncer! **System** BBC B **Price** £9.95 **Publisher** Mirrorsoft 01-353 0246 **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Retail

Don't let the packaging fool you. *Hi Bouncer!* may feature Roger Hargreave's lovable Mr Men characters, but it's not just a game for younger players, even if arcade freaks may find it a bit simple.

Objectives

There are four screens, each with different goals. In the first you have to retrieve Mr Tall's scarf, which keeps jumping around, blown by the wind. The second screen involves trying to land feet first on a see-saw to rouse Mr Lazy. Screen three sees you attempting to catch fruit for Mr Bump while in the fourth you try to protect Mr Snow from the blazing sun.

In play

The tape comes with two versions of the game. On side one there's a practice game, followed by the arcade speed version, and this order is reversed on side two, a very good idea.

The graphics are pretty good, the backgrounds are simple scenes but quite well done. Screen one, for example, shows Mr Tall at the right, a road running off into the distance and the action takes place on a road at the foot of the screen. At all levels other Mr Men appear and move around the area of play, but jumping onto, or bumping into, any of them loses you a life. You'll also suffer should you hit any of the pitfalls, such as puddles or birds.

Losing a life makes Mr Bounce zoom around the screen like a demented punctured balloon. Clouds and birds drift across the sky and the whole atmosphere is nicely relaxed.

Control of Mr Bounce is via joystick or keyboard. For the latter, there's the usual configuration of Z and X for left and right, with asterisk for jump and the question mark for slowing down. The controls are such that you can alter the in-flight trajectory of Mr Bounce, which can make for some interesting manoeuvres.

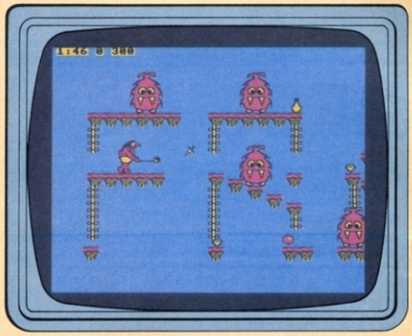
Verdict

This is an amusing, varied and colourful game. The practice programs will allow the youngest games player to make good progress, but the arcade speed version will hardly test more experienced players. There's no violence and, while the movement is restricted to up, down, left and right in the one plane and the tasks are fairly similar, the backgrounds and graphics are sufficiently different to sustain interest.

Bryan Skinner

RATING (/5)

Lasting appeal	
Playability	
Use of machine	
Overall value	



Stone-age suicide

Name Frak! **System** BBC B **Price** £8.95 **Publishers** Aardvark Software, 04024 53131 **Format** Cassette **Language** Machine code **Other Versions** None **Outlets** Mail order/retail.

Come with me, if you will, back to days BC, or even BBC-BC, when Poglets ruled the world and the expression *Frak!* was commonly heard down at the Caveman's Arms.

Objectives

In this arcade challenge all you have to do is play the part of a Trogg and survive leaping across platforms and running up and down ladders, just as in a hundred other arcade games.

First impressions

Though the packaging looks cheap, you know the game isn't as soon as it's loaded, and you get an impression of the quality of the graphics when you're introduced to the characters involved, *ie* the Trogg, and the monsters Scrubbly, Hooter and Poglet. Don't let their appealing hairy features fool you, they'll part you from one of your three lives all too easily should you barge into them.

In play

You run and jump along the linked series of platforms, and up and down the ladders, collecting the bulbs and gems for bonuses, as well as the occasional key for another bonus based on time remaining on a counter. The monsters lounge around, usually in the most awkward places but, fear not, you are armed with that most deadly of weapons, the yo-yo, which was all the stone age rage. One deadly swing from your yo-yo (using the Return key) and the monster meets its maker.

Also impeding your progress are daggers and balloons . . . probably inflated mammoth bladders, but I'm only guessing. These float straight upwards from the floor, while daggers descend diagonally from the top: the result of a close encounter? A cry of Frak! and a life lost.

The screen scrolls automatically from right to left, so you don't get a series of consecutive screens as in *Manic Miner*, for example. You just keep on going . . . The graphics are first-class, very funny and colourful, with the Trogg loping along on his little legs. Accuracy could be improved. Daggers pass beneath your feet or way over your head and before you know it: Frak!

A slight problem lies with the control keys: using Return to swing the yo-yo is rather awkward. But these minor complaints don't really detract from a first-class, difficult game . . . players who love to twiddle their fingers to try and score millions should be well satisfied.

Verdict

Frak! is a smooth, difficult and amusing game, with good sound, and is well worth seeking out for the graphics.

Mike Gerrard

RATING (/5)

Lasting appeal	
Playability	
Use of the machine	
Overall value	

Four excellent games for the 64 kept Bob Chappell wired up to his computer.

Commodore crackers

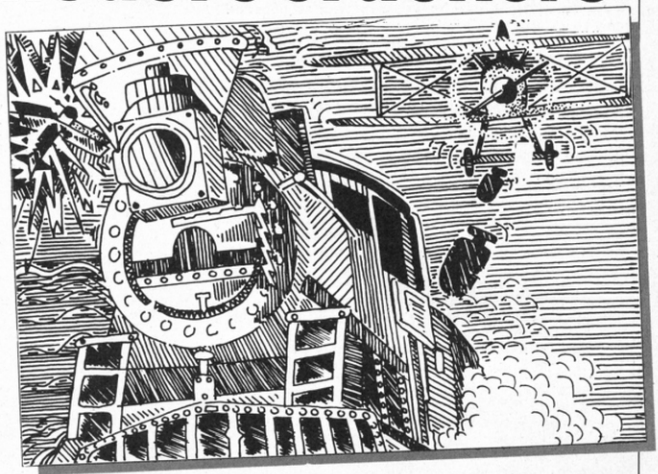
FRANTIC FREDDIE

Frantic is the right word in this game of chase-me-round featuring platforms and ladders. Our hero Freddie is a telephone engineer whose wildest dream has come true. There, resting temptingly on the telephone wires and his for the taking, are several pots of gold. Freddie just has to nip up the nearest telegraph pole, waddle along the wires, and it's goodbye British Telecom, hello Bahamas.

Dreams often turn to nightmares and Freddie's is no exception. Shimmying along the wires to spoil all the fun comes, not Busby, but a bunch of Greeblies. These oval ogres waltz the network after poor Fred who could avoid them all quite easily were it not for one small earthly factor — dream or nightmare, he still can't walk through solid objects, to wit, telegraph poles. He has to shin up one side and down the other. The Greeblies don't suffer this handicap but Freddie can still win out — if he pockets all the pots, the Greebly tribe quakes and topples headlong.

Should a Greebly knock Freddie off the wires or poles, the screen shakes as he hits the ground; Freddie comes cartwheeling back up again but is in no fit state to continue — one of his three lives is disconnected. Freddie can progress through 16 screens, each one with a different looking gang of Greeblies and a new layout.

That's not all — there's super music (ten different tunes — loved the opening rock n' roll number), cartoon interludes, bonus characters and daft messages. Beating the Greeblies may drive you up the pole but you'd be barmy not to buy this one. Frantic fun.



SLINKY

And so to wires of another kind. Remember Slinky, a wiry spring-like object that you used to let loose at the top of the stairs so that it would obligingly 'walk' down?

In this superb game, probably more familiar to you from the arcades as *Q-Bert*, Slinky's home is a massive pile of cubes. You must guide Slinky across one face of every cube, turning it a different colour on contact. Once all the cubes have been changed, on and upwards to the next level.

Sounds boring? Don't you believe it. Among the hazards are a nomadic magnet that drags you off the pile and drops you into the abyss below, a raindrop that speeds you up if it touches you and a dust cloud that slows you down. If both wet and dusty, you rust solid and an oil-can arrives and carts you off to the scrap metal yard.

Still not convinced? There's a vacillating metallic head, hyper holes, a cube hopper and, sensationally, 99 levels of play which include a variety of character and cube behaviour.

As icing on a very rich cake, between levels you may get a high-speed action replay or one of several amusing cartoon displays. But for me the cherry on the top was what happens when you succeed in completing a level. The screen explodes with a firework display, flags wave and the 1812 overture thunders out. Exhilarating.

Excellent graphics, oodles of variety, cracking sound effects — Slinky is undoubtedly the monarch of cube games.

LOCO

This game of locomotive lunacy has you driving a classically designed steam train across your screen.

You have a side-on view of the action. No sooner has the large loco been flagged on its way by the waving station master and begun puffing along the merry track, than trouble strikes. Planes and airships start dropping enormous bombs while steaming down the rails towards your loco come runaway, explosive-laden carts. Your loco has two defence systems — blasting a jet of steam forward eradicates a cart while puffing smoke into the sky brings overhead enemies to grief.

To help you drive your train through the five stations, an aerial display at the bottom of the screen shows your position on the immediately surrounding six-track layout. Using this, you can take evasive action by switching from track to track, trying to call in at fuel depots as you go.

Loco has high-quality, smooth-scrolling graphics and makes good use of sound. Together with its five skill and two speed levels, it all adds up to a first-rate game, one of the best yet from Alligata. Steam out and get it.

HORACE GOES SKIING

Horace became a cult figure among Spectrum owners. He is a cute cartoon blob on legs who in this game must cross a busy road to get to borrow some skis. Once kitted out, Horace enthusiastically launches himself down a giant slalom course, doing his best to avoid getting creamed on the trees and flags.

Simple, unsophisticated stuff but all good clean fun. If you've never played with Horace, now's your chance.

PCN

Frantic Freddie, Slinky (tape £8.95, disk £12.95) Audiogenic, Reading 0734 586334. **Loco** (tape £7.95) Alligata Software, Sheffield 0742 755005. **Horace Goes Skiing** (tape £5.95) Melbourne House, London 01-940 6064.

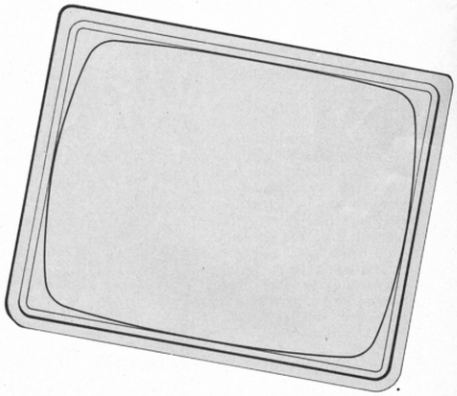
BULLFIGHT

If you have just returned from your summer holidays and next year's feel rather a long way off, here is a program for the Commodore 64 from Diane Sketchly of Sawbridgeworth in Herts which will whisk you straight back to the Costa del Sol.

You take the part of a flamboyantly dressed matador in this (thankfully) less bloodthirsty than normal version of a bullfight.

As you enter the arena, red cloak in hand, the bull who has been sitting quietly in his pen becomes angered at your presence and starts to charge at you. Although much larger than you he is considerably more agile and moves across the screen much faster than you do. Your only means of escape is to dodge behind various objects which have been thrown into the bull ring by the audience — these objects will make the bull bounce back into one of the corners. They do, however, also have the effect of putting you back to the starting position, so your best bet is to hide behind one of the objects and wait for the bull to charge straight into it. In this way it is possible to make your way towards the bull pen, which is the aim of the game.

The game uses some very convincing sprite graphics and there is a little Spanish musical intro to set the atmosphere.



Title: *Bullfight*
Machine: *Commodore 64*
Language: *Commodore Basic*
Application: *Game*
Author: *Diane Sketchly*

Program notes

0	Sets border and background colour and then GOSUB instructions
1-3	Data for theme tune and then GOSUB to play the theme tune
15	Changes border and background colours
20	Sets up pointer to Vic II chip and then enables sprites and pointers

```
0 POKE53280,1:POKE53281,1:GOSUB8000
1 DATA2400,8,3034,8,3600,16,3600,8,3823,
8,4291,8,3823,8,4291,8,3823,16
2 DATA3600,8,3215,8,3034,8,3215,8,3600,6
4,-1,-1
3 GOSUB7710:SS=0
15 POKE53280,7:POKE53281,7
20 PRINTCHR$(147):V=53248:POKEV+32,11:PO
KEV+33,11:POKEV+16,2
30 X=35:Y=50:MX=50:MY=225
40 POKEV+21,7:POKE2040,192:POKE2041,194:
POKE2042,195
50 FORN=0TO254:READ0:POKE12*1024+N,0:NEX
T
60 POKEV,X:POKEV+1,Y:POKEV+39,0
70 POKEV+2,MX:POKEV+3,MY:POKEV+4,35:POKE
V+5,50
80 POKEV+28,2:POKEV+37,7:POKEV+38,2
90 FORB=1063TO2023STEP40:POKEB,116:NEXT
```

30	Sets up variables	150	Sets screen colours	400-430	Moves bull in pursuit of matador
40	More sprite pointers	200-250	Checks for input from keyboard to move matador	440-450	Checks whether the bull has collided with either the matador or an object
50	Reads in sprite data	260-350	Checks to see if the matador has moved off the screen	451	The matador has made it
60-80	Position and colours for sprites				
90-130	Draws borders				

```
100 FORB=1984TO1024STEP-40:POKEB,116:NEX
T
120 FORB=1176TO1456STEP40:POKEB,116:NEXT
130 FORB=1616TO1856STEP40:POKEB,116:NEXT
140 POKE1164,97:POKE1485,87:POKE1844,104
:POKE1309,94:POKE1594,83
150 POKE55436,4:POKE55757,3:POKE56116,5:
POKE55581,8
200 REM
210 MA=2
220 IFPEEK(197)=18THENMX=MX+MA
230 IFPEEK(197)=10THENMX=MX-MA
240 IFPEEK(197)=23THENMY=MY+MA
250 IFPEEK(197)=9THENMY=MY-MA
260 IFMX>254THENGOSUB5000
270 IFMX<0THENGOSUB5030
280 IFPEEK(V+31)=2THENPOKE(V+16),2:MX=50
:MY=220:GOSUB7500
300 IFMY<50THENMY=50
310 IFMY>225THENMY=225
350 POKEV+2,MX:POKEV+3,MY
400 IFX<MXANDPEEK(V+16)=0THENX=X+3:POKE2
040,193
410 IFY<MYANDPEEK(V+16)=0THENY=Y+3
420 IFX>MXANDPEEK(V+16)=0THENX=X-3:POKE2
040,192
430 IFY>MYANDPEEK(V+16)=0THENY=Y-3
440 IFPEEK(V+31)=1THEN5050
450 IFPEEK(V+30)=3THEN6000
451 IFMX<35ANDMY=50ANDPEEK(V+16)=0THEN70
00
455 POKEV,X:POKEV+1,Y
460 GOTO200
5000 MX=MX-255:POKEV+16,2:RETURN
5030 IFMX<0THENMX=MX+255:POKEV+16,0:RETU
RN
5050 R=INT((5-1)*RND(1))+1:ONRGOTO5060,5
070,5080,5090
5060 X=35:Y=50:GOSUB7500:GOTO450
5070 X=253:Y=50:GOSUB7500:GOTO450
5080 X=50:Y=225:GOSUB7500:GOTO450
5090 X=253:Y=225:GOSUB7500:GOTO450
6000 VL=54296:W=54276:A=54277:H=54273:L=
54272
6010 FORXX=15TO0STEP-.5:POKEVL,XX:POKEW,
129:POKEA,15:POKEH,4:POKEL,48:NEXT
6030 FORMY=MYTO50STEP-1:POKEV+3,MY:NEXT:
PRINTCHR$(147)
6031 POKEW,0:POKEA,0
6035 PRINT"<RON><DWN><DWN><DWN><DWN><DWN
><DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN
><DWN><DWN><RHT><RHT><YEL>HARD LUCK
! THE BULL HAS BEATEN YOU."
6060 POKEV+21,0:POKEV,155:POKEV+1,75:POK
EV+21,1
6065 POKE53277,PEEK(53277)OR(2^0):POKE53
271,PEEK(53271)OR(2^0)
6075 POKEVL,15:POKEA,64:POKEW,17
6076 FORTM=1TO250:NEXT
6080 POKEH,17:POKEL,37
6085 POKEW,0:POKEA,0:POKEL,0
6086 POKE53277,PEEK(53277)AND(255-2^0):P
OKE53271,PEEK(53271)AND(255-2^0)
6090 SS=SS+1:IFSS<10THEN6065
6100 PRINTCHR$(147):PRINT"<DWN><DWN><DWN
><DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN
><DWN><DWN><DWN><DWN><RHT><RHT><RHT><RHT
><RHT><RHT><RHT><RHT><YEL><RON>LIKE TO T
RY AGAIN? Y/N"
6110 GETA$:IFA$="Y"THEN6130
6120 IFA$="N"THENEND
6125 GOTO6110
6130 POKEV,35:POKEV+1,50:RESTORE:POKEV+2
1,0:GOTO3
7000 POKEV+21,0:PRINTCHR$(147)
7010 PRINT"<DWN><DWN><DWN><DWN><DWN><DWN
><DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN
><DWN><RHT><RHT><RHT><RHT><RHT><RHT><RHT
><RHT><YEL><RON>WELL DONE! YOU MADE IT!"
7020 POKEV+2,155:POKEV+3,75:POKEV+21,2
7030 POKE53277,PEEK(53277)OR(2^1):POKE53
271,PEEK(53271)OR(2^1)
7040 VL=54272:POKEVL+24,15:POKEVL+1,110:
POKEVL+5,8:POKEVL+6,0
7050 FORJ=1TO8:POKEVL+4,33
7060 FORK=1TO70:NEXTK
7070 POKEVL+4,0:FORK=1TO80:NEXTK:NEXTJ
7090 POKE53277,PEEK(53277)AND(255-2^1):P
OKE53271,PEEK(53271)AND(255-2^1)
7100 SS=SS+1:IFSS<4THEN7030
```

BULLFIGHT

to the bull pen
5000-5030 Wraps screen around
5050-5090 Resets bull after a collision with an object to a randomly defined corner
600-6010 Plays sound for end of game
6030 Scrolls matador upwards and then clears the screen
6035 Prints 'you lose' message in the centre of the screen.
(<RON>=Reverse on, <RHT>=Cursor right, <YEL>=Yellow)
6065 Expands bull horizontally and vertically
6075-6085 Produces sound with a time delay
6086 Decreases the size of the bull
6090 The bull flashes large and small ten times
6100 Prompts for another go
7000-7090 Win routine: Prints winning message, flashes matador ten times and plays tune
7500-7540 Sound for collision with objects
7710-7820 Plays the sound for the theme tune from data statements 1 and 2
8000-8130 Instructions
10000-10220 Data for sprites

PCN

```
7110 GOTO6100
7500 POKE54296,15:POKE54277,64:POKE54276
,129
7520 POKE54273,17:POKE54272,37
7530 POKE54296,0:POKE54277,0:POKE54276,0
7540 RETURN
7710 C=54272
7720 NL(0)=C:NH(0)=C+1:W(0)=C+4:AD(0)=C+
5:SR(0)=C+6:VL=C+24
7730 FORRE=CTOC+24:POKERE,0:NEXT
7740 POKEAD(0),64+9:POKESR(0),240+0
7750 POKEVL,10
7760 READF,DUR:IFF<0THENPOKEW(0),0:RETUR
N
7765 DUR=DUR*5
7770 NH(1)=INT(F/256):NL(1)=F-NH(1)*256:
POKENH(0),NH(1):POKENL(0),NL(1)
7790 FORCO=1TODUR:NEXTCO
7800 POKE54275,5:POKEW(0),65
7810 FORPA=1TO50:NEXTPA
7820 GOTO7760
8000 PRINTCHR$(147):PRINTTAB(15)"<RON>BU
LLFIGHT":GOSUB7710:RESTORE:PRINT
8010 PRINT"<RHT><RHT><RHT>YOU MUST HELP
THE MATADOR REACH THE  BULL PEN"
8020 PRINTTAB(15)"KEYS ARE :"
8030 PRINTTAB(15)"W - UP"
8040 PRINTTAB(15)"X - DOWN"
8050 PRINTTAB(15)"A - LEFT"
8060 PRINTTAB(15)"D - RIGHT":PRINT
8070 PRINT"<RHT><RHT><RHT>THE MATADOR MA
Y ENTER ARENA THROUGH  ANY OF THE 3 GATE
S":PRINT
8080 PRINT"<RHT><RHT><RHT>THE BULL WILL
RETREAT TO A CORNER IF"
8081 PRINT"HE HITS ANY OBJECT THROWN BY
THE CROWD":PRINT
8090 PRINT"<RHT><RHT><RHT>IN EMERGENCY M
ATADOR CAN RESTART BY"
8091 PRINT"TOUCHING AN OBJECT OR FENCE":
PRINT
8100 PRINT"<RHT><RHT><RHT>BULL IS TOO FA
ST TO OUTRUN. TRY TO"
8101 PRINT"KEEP AN OBJECT BETWEEN HIM &
MATADOR":PRINT
8110 PRINTTAB(12)"<RON>ANY KEY TO START"
8120 GETA$:IFA$=""THEN8120
8130 GOTO3
10000 DATA0,0,0,0,0,0,0,0,0,0,63,128
10010 DATA0,127,192,0,255,240,7,255,248,
15,255,252
10020 DATA255,255,254,31,255,255,255,255
,255,27,255,255
10030 DATA31,255,255,31,255,255,30,127,2
55,12,127,255
10040 DATA0,255,253,1,223,121,3,176,114,
7,96,228,14,192,224,0
10050 DATA0,0,0,0,0,0,0,0,0,1,252,0
10070 DATA3,254,0,15,255,0,31,255,224,63
,255,240
10080 DATA127,255,255,255,255,248,255,25
5,255,255,255,216
10090 DATA255,255,248,255,255,248,255,25
4,120,255,254,48
10100 DATA191,255,0,143,251,128,78,13,19
2,39,6,224,7,3,112,0
10120 DATA3,224,0,15,248,0,3,224,0,1,192
,0
10130 DATA0,128,0,31,252,0,31,254,0,59,2
54,0
10140 DATA114,255,0,193,231,255,97,231,2
55,51,247,255
10150 DATA11,247,255,19,55,255,35,55,255
,67,49,255
10160 DATA131,48,255,3,48,255,3,48,63,3,
48,63,7,56,31,0
10180 DATA251,54,24,219,54,24,219,54,24,
243,54,24
10190 DATA219,54,24,219,55,223,249,231,2
23,0,0,0
10200 DATA0,0,0,249,243,48,217,243,176,2
17,131,176
10210 DATA249,227,240,193,131,112,193,24
3,112,193,243,48
10220 DATA0,0,0,255,255,255,128,0,1,128,
0,1,255,255,255
```

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PALACE software

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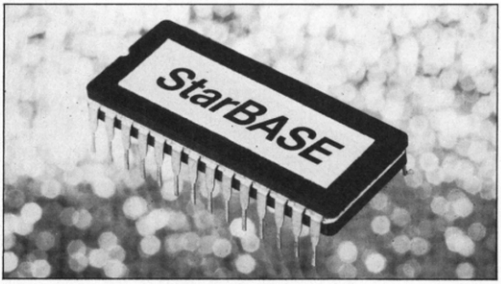

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Spectrum ZX, Microdrive, Interfaces 1 and 2, ZX printer, paper, 4 cartridges, 2 joysticks, Sanyo DR101 tape recorder, software, books, posters, magazines, leads, excellent condition, worth £450+ want £380 ono. Tel: 0303 69096.

Wanted ZX80 16K RAM pack, Vic20 Superlander, Computer War, Chariot Race, Jet Pac, Atarisoft Defender. Will buy or may consider swaps. Tel: 0558 822509.

Swap Atari software disk or cassette. Tel: 0724 845252, ask for Stephen.

Spectrum 48K and Currah Speech Synth, programmable joystick interface and joystick. Also 19 titles including Prolog, Valhalla, Fighter Pilot. vgc, £170. Tel: 03224 36036.

Oric Atmos 48K, 9 month guarantee left, plus Tansoft word processor cassette, only £120. Also Oric/Oricstar word processor cassette, £5. Tel: Aylesbury 0296 88490.

TI99/4A expan-box, 32K RAM, RS232, speech-syn, minimemory, ext-Basic, TEII, ed/ass, PRK, report/g, statistics, adventure, parsec, Othello, prog/aids. Sensible offers, sae Johnson, 8 Ullswater Bracknell, Berks RG12 4XQ.

Wanted cartridge Dragon Data Alldream. Also Grosvenor software Rtty. Will swap original software or will buy. Tel: 0273 779295 after 7.30pm.

64 Games, sell or swap. Includes: Blagger, Pole Position, Pirate Cove, plus over 70 others. Tel: 052785 2518, ask for Lee after 6pm.

BBCB 1.20/S, ROM board, RX80F/T, printer ROM and disk doctor, graphics ROM, Worwise, disk, interface, speech games, cassettes disk and more. £950. Tel: 01-226 0590 before 6pm.

Nic 20. Complete starter pack + joystick 8K expansion, £80 worth of software, as new, £80 ono. Tel: Mike on Dudley 237736 daytime.

CBM64 including C2N cassette, Simons Basic, Programmers Reference guide, books, magazine and £75 of software including "The Hobbit", £195. Tel: Mark on 04012 4576.

Wanted Atari 800XL, swap for 800 48K + lots of software disk and/or ROM. Also wanted 850 interface. Also sell software. Tel: 0526 21187.

Atari Software: Defender Centipede Gorf Thorn Soccer ROM + some cassettes. Reasonable offers, and disk software to swap. Tel: Michael 022029 830 7-9pm.

Tandy CGP-115 colour graphics printer and Dragon lead. Cost £167. Sell for £99. Tel: 01-360 3443.

Unwanted Present. Oric MCP 40 colour printer/plotter. Atmos compatible. Never used. £70 ono. Tel: (0533) 849137 (home), (0533) 24124 (work).

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Osborne 80-Col Double density, Wordstar Supercalc etc. £700 Tel: 01-485 1462.

Vic 20, brand new unwanted gift, + cassette recorder, 16K RAM, joystick, games, books. Worth over £220, will accept £120 for quick sale. Tel: Uxbridge 0895) 57218.

Wanted Commodore 64 with manual, no software wanted. Will swap Dragon 32, £130 of software, (original), leads, joysticks, magazines, and tape recorder. 0202-737244.

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Commodore PET 32032 full keyboard, with cassette unit and games software. £195. Tel: (0253) 869108. 197 Victoria Road East, Thornton, Blackpool.

Dragon 32, tape recorder, and book, as new. £95. Tel: David 01-980 4888 ext. 252, 9-5 only.

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16K VIC-20 with cassette recorder, many rare games including Llamasoft and Bug-Byte, five cartridge games, joystick and many books. Only £130. Tel: Crawley 542312.

QL for sale. Offers — Tel: 01-360 3311.

Brother EP22 memory typewriter/printer with built-in computer interface, including mains adaptor. Also arcade video games system with built TV. Tel: 02731 695351.

48K Spectrum + Kempston joystick + interface + cassette recorder + 60 games + 100 mags, all under 4 months old, in VGC. Must sell quickly, hence price of £185 ono (worth £310).

Commodore 3040 dual disk. Upgraded to DOS 2.1. For Pet or 64. £300. Superior teletype ASR 33, RS232, silence cover and pedestal, £50. Tel: 01-451 0520.

Interface One, two Microdrives, and two books on use of Microdrives, £90. Tel: Chelmsford (0245) 83410.

96K lynx, parallel printer, interface and tape recorder. Lynx computing book, Lynx User (two issues). Excellent condition. Worth £380, sell for £260. Tel: 01-803 6873.

ITT 2020 48K £250, Integer card + prog. aid # £50 16K Ramcard boxed as new, £50, parallel printer card, £25. Disk drive card, £25. Lower case adaptor board REV (2-7), £15. Tel: Keir (0268) 43079 evenings. Offers considered.

ZX Spectrum 48K + joystick + sharp tape recorder, + £200 of software including Stop the Express, Hunchback, Zoomm, Ant Attack, Sabre Wulf. Sell for £195 ono. Tel: (Stroud) 6272.

Cheetah Spectrum 32K Rampack, hardly used. Boxed cost £39.95, sell for £27. Tel: 04606 3753.

Vic-20 with cassette recorder, joystick, cartridges, and games — mint condition — £85. Also Video Genie, 48K RAM, monochrome monitor, huge software library — offers. Tel: Gt. Yarmouth 662102.

ZX81 Computer, 16K expansion, printer, (all Sinclair). Plus 4 extra printer rolls, manuals. Good condition. Lot £60. Russell Tel: 01-609 2983.

For sale, *PCN* from six to this issue. Highest offer secures, might deliver. Wildey, 60a High Street, Bexley, Kent DA5 1LA.

TI99/4A + expansion box + RS232) Centronics) 32K RAM, + floppy disk & controller, + CGP plotter, + green highres monitor, + joysticks, + software. £760 ono. Also new. Tel: Hemel Hempstead 211323 — evenings.

Commodore 64 CZN MPS801, software includes Simon's Basic, Forth, Soccer Ultisynth, Hobbit etc. Less than 6 months old. £720 worth for £470 ono. Reading 62346.

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Microvision system with Blockbuster and Connect 4 cartridges to sell for £25; also Grandstand TV game with two joysticks, sound and colour for £25. Both in new condition. Tel: West Wellow 23041 (eves).

Electron, hardly used, Leads, games, copier, magazines, Brainteazers book. Games include Pedro, Bandits, Space Shuttle. Excellent condition £180.

Spectrum software for sale or swap. 240 top titles. Send your list or needs to 36 Anthony Drive, Sprowston, Norwich, Norfolk NR3 4EN.

Vic 20 3K RAM tape recorder; software including Amok, Arcadia; books — Programmer's Reference Guide, Vic Revealed, Learn Computer Programming, plus mag. Boxed with instructions £75. 01-736 3268.

Sharp M280K computer, 48K, inc. Monitor tape, tapes + disks, software manuals. £155 ono. Tel: 01-341 0179 after 6pm, Barry.

Newbrain 8d, manuals, demo. Newbrain Dissected, software. £170. Tel: Tadley (Hants) 3888.

Tandy Model 1, 48K, disk drive, printer cable. Software includes word processing, database, Visicalc, 30 data disks, new computer forces sale, £395 ono. Tel: 01-803 8834.

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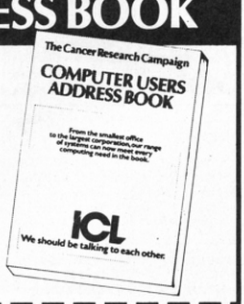

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It never strikes twice

At *PCN*'s recently established Just Asking For It Department we hear that the premises of Lightning Software were struck by lightning last month.

After the kerfuffle over York Minster we suggest that Ocean start filling the sandbags, Artic defends itself against runaway juggernauts with strategically placed concrete blocks, and BugByte stocks up with DDT. Llamasoft, Alligata and Aardvark should be all right.

Plain talk for rodents

PCN's tireless attempts to get the expression Wimps (Windows, Icons, Mice Programs) into the language hasn't been an overwhelming success so far — just one plagiarised mention in the *Daily Telegraph* about a month ago. But we obviously have a sympathiser at the maker of Apple-like motherboards, U-Microcomputers.

Running a northern company, Dr Bill Unsworth of U-Micro may feel that he should have a reputation for plain speaking. Talking about Wimps he said: '. . . you don't need gimmicks like mice. People work best if they concentrate on one job at a time — software that works like that is actually more user-friendly than those damned windows with rodents and hidden (*ie* pull-down) menus.'

Hear hear. Or as the Australian poet Roy Waldo Emerson might have said: 'G'day. Build a better mouse trap and the world will break your windows.'

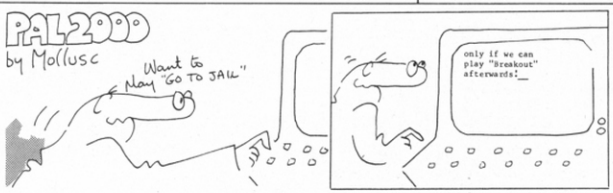
Thorn in the side

There aren't many sides of the UK micro scene that Thorn EMI doesn't stick into — making systems, marketing software, and now developing world-beating ICs as the owner of Inmos.

This all means Thorn EMI probably has more competitors than the average company but it looks as if it's aiming to thin them out soon by fair means or foul.

Last week it ordered an Electronic Warfare Scenario Generator (EWSG) from Software Sciences, itself a part of Thorn EMI.

'There is no real alternative to the EWSG,' said Thorn's Mike Penery darkly. You have been warned.



SYNTAX ERRORS

One of the listings in issue 72's Atari P/M graphics article contained an error. Line 10100 should read:

```
10100 P1PL=53260: P2PL=53261:
      P3PL=53262: P4PL=53263:
      POS1=53248: POS2=53249:
      POS3=53250: POS4=53251:
      WHERE=A+8: RETURN
```

NEXT WEEK

QL dissected — *As the dust settles, we look at Sinclair's undisputed champion in The Most Talked-About Micro of the Year stakes.*

100 Plus — *The Tandy Model 100 book-size machine now has disks and a monitor — we put them on the test-bed.*

Memo-kit — *For programmers of the Memotech micros we review a set of specialist tools.*

Graphics spec — *Tone up the graphics on your Spectrum with the aid of this feature.*

Star cluster — *The VizaStar integrated bundle puts Commodore's 64 into line with the main business software trend; find out how it rates.*

Gameplay — *We round up the latest BBC software and review Spectrum games.*

Pogo Romeo — *For Oric owners, our program listing gives you the chance to play Cupid with a group of pogo-sticking Romeos.*

PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Electron & BBC Micro User Show	August 31-Sep 2	UMIST, Manchester	Database Publications, 061-456 8383
IBM System User Show	Sept 3-5	Olympia	EMAP International Exhibitions 01-837 3699
Hampshire Computer Fair	Sept 6-7	Guildhall, Southampton	Testwood Exhibitions, 0703-31557
Walthamsoft '84	September 8	Walthamstow, London	London Exhibitions and Promotions 01-554 5039/3498
PCW Show	Sept 19-23	Olympia	Montbuild 01-486 1951
Computer Communication & Control	Sept 26-28	Brighton Centre	Institution of Electrical Engineers 01-240 1871
Computer Technology Exhibition — Comtec	October 3-5	Spennymoor, Co Durham	Industry Section, Sedgefield District Council, 0388-816166
Computer Graphics FX Exhibitions	October 9-11	Wembley, London	Online Conferences Ltd 01-868 4466
Apricot & Sirius Computer Show	October 16-18	Manchester	Paradox Group Ltd, 01-241 2354

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Computers in Education Exhibition	Sept 3-5	Sydney, Australia	Convention and Exhibition Administration, PO Box 259, Roseville, NSW 2069, Australia
International Exhibition of Data Processing, Communication Telematics & Office Org. — SICOB	Sept 19-28	Paris, France	French Trade Exhibitions, 01-439 3964
SE Asia Regional Computer Conference	Sept 24-27	Hong Kong	Industrial & Trade Fairs International, 021-705 6707

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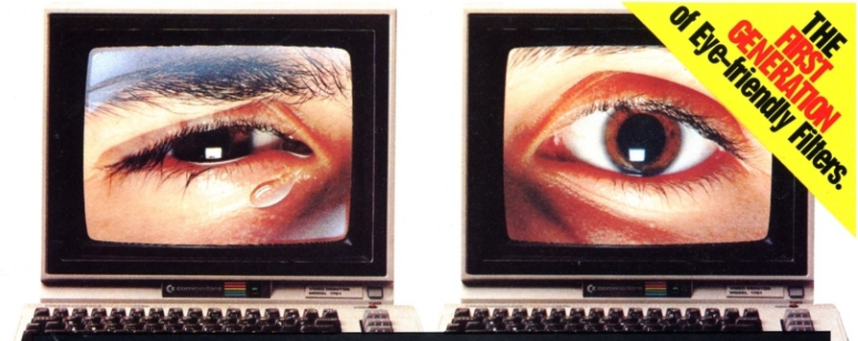

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Mounted and removed in seconds by invisible velcro fastenings, the anti-static, anti-shatter CEAF is a major step forward in the operational safety of computer displays—unprotected screens can cause blurred vision, watery and itchy eyes, headaches and (according to such authorities as the Institute of Ophthalmology) even permanent changes in eyesight.

Scratch-resistant, durable and easily cleaned without expensive sprays and agents, 9", 12" and 14" CEAFS are available from leading retailers at only £19.95 including VAT.

Or fill in the Freepost coupon and your CEAF will be despatched within 48 hours. Orders can also be placed around the clock by phoning the CEAF Department on (091) 414 5524, quoting your Access Card number. For other screen sizes, please ring or write — the CEAF prices for 'specials' would be considered very competitive.... if there was any competition!

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ROAD FROG by courtesy of Ocean Software. MTA 4628

To FREEPOST ROMAG, CEAF Dept. PCN, Blaydon on Tyne, Tyne & Wear NE21 5SG. Telephone: (091) 414 5524

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ROMAG CEAF

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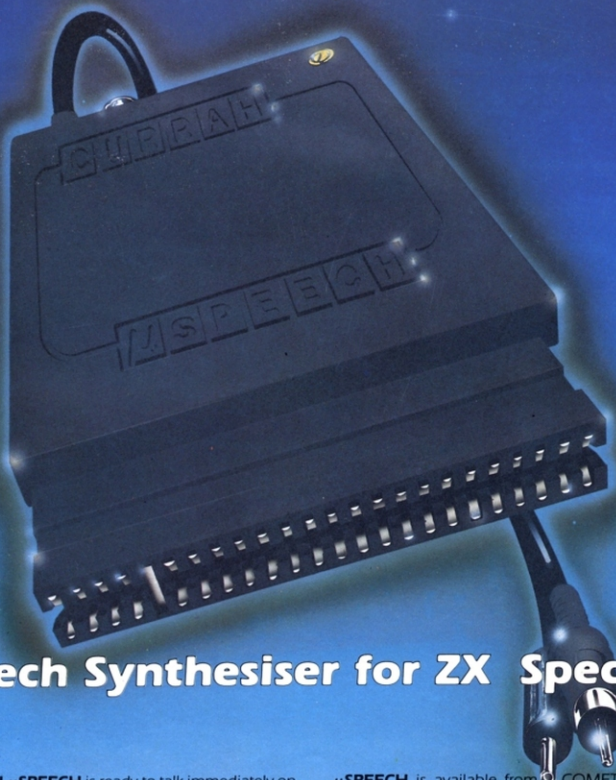
CURRAH μSPEECH



Speech Synthesiser for ZX Spectrum

The **CURRAH μSPEECH** is ready to talk immediately on power-up, has an infinite vocabulary and outputs speech and ZX Spectrum sound through your TV speaker. There is no software to load with **μSPEECH** — sophisticated Gate Array technology means you can just plug in and start constructing words and sentences like this:
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μSPEECH is fully compatible with ZX Interface 1 and may be used with the **CURRAH μSLOT** Expandable Motherboard, allowing easy expansion of your ZX system. **μSPEECH** and **μSLOT** will also be compatible with the **CURRAH μSOURCE** unit when it arrives later this year, allowing you to write **Assembler** and **FORTH** statements directly into your **BASIC** programs!

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μSPEECH is available from COMET, W.H. SMITH, WOOLWORTHS, GREENS, BOOTS, JOHN MENZIES, SPECTRUM STORES and good dealers nationwide — or use the form to order the **CURRAH μSPEECH** — winner of the CTA 'Product of the Year' award 1984.

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